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THE TREATMENT OF EPILEPSY.

A Medical and Surgical Symposium.[1]

THE MEDICAL TREATMENT OF EPILEPSY.

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In opening the debate on a subject so difficult to confine within set boundaries as that with which we deal this evening, I propose to myself the strictest limitations. My desire is to know whether any others have been more successful than I in the treatment of epilepsy, and whether it is not desirable to pursue investigations along lines other than those which have been followed.

Our subject this evening is the *treatment* of epilepsy, which of course involves more or less of its diagnosis and enables me to set aside at once all cases of distinct trauma, where surgical interference becomes desirable. There remain for consideration all those cases of epilepsy which are various in type and are known as idiopathic, a term conventionally employed and which, it is to be hoped, may some day be set aside.

Treatment includes: First, the suppression of the *symptom-complex* by the use of drugs or other forms of general treatment; and secondly, the treatment during the brief period of the aura, which sometimes affords an opportunity to cut short the sequence of symptoms.

Let us deal with the first. We must, I am sure, feel a sense of therapeutic despair whenever a case of ordinary epilepsy appears for treatment at a clinic—nor does wealth make the situation much better. I must frankly admit that none of the remedial measures we apply for the general treatment of idiopathic epilepsy has any firm foundation upon reason or trustworthy experimentation on the lower animals. No man can tell me to-day why bromides prevent epileptic explosions; nor is there any theory as to the causation of epilepsy which is not contradicted by some of the phenomena of this puzzling disorder. Most rare are reflex epilepsies; I have seen but two, once from a bean in the nose, and once from a crushed testicle. Both were cured by operation, and were reported by Hinsdale. It is conceivable that in nerve centers normal or abnormal substances may accumulate until they result in irritative symptoms and discharges of neural energy. But how then could this sequence be arrested by a mere sensory stimulation, like a ligature on an arm, or by abruptly dilating the cerebral vessels with amyl? The explosions would only be put off for the minute; the activating poison would remain.

The ingenuity of therapeutics has become bankrupt in the effort to find drug cures for epilepsy. It is needless to run over them, and I limit myself simply to the statement of certain conclusions. One of these is that the bromides are useless in certain cases of the minor epilepsy (petit mal), which respond favorably to some of the coal-tar products. This was not an uncommon experience in my clinic, and has

[1] Read before the College of Physicians of Philadelphia, Feb. 7, 1912.

been also observed in that of Dr. John K. Mitchell. Then there are examples of the lesser epilepsy which are made much worse by bromides; and also there are rare and inexplicable cases of the greater epilepsy in which bromides make the convulsions more violent and increase their number.

I may say that I have not found any great difference between the various bromides, such as has been asserted by some French observers, nor any special value in mixing them. For rapid action and for soothing purposes, I am of the opinion that the lithium bromide is the best. I state this with the doubt of self-criticism, because I myself introduced it into medicine. It is, however, the only deliquescent bromide, and contains the largest percentage of the agent bromine, which seems to be that which gives value to these salts.

It would be useless to talk to a set of men such as are here to-day in regard to the management of the doses of the bromides. Their deleterious effects are well known, and it is desirable, of course, to give just that amount of bromide which being added grain by grain on the return of attacks will finally prevent the occurrence of any attack. During this process of gradual increase you run against the occasional difficulty that effective doses, varying with the individual, may produce loss of memory, inertness, low spirits, and in rare cases forms of positive melancholia, maniacal excitement, and even suicidal or homicidal mania. You may play all the tricks you will, using arsenic, hot baths, and what not, and still you will sometimes be driven to conclude that a man had better have epilepsy than be overdrugged with bromides. Of course, where the attacks come at long intervals, this is the obvious course.

Although the effects of bromide on the skin are annoying, they may generally be avoided if the person will bear full doses of arsenic and use hot baths. There is, however, a small percentage of persons who are so susceptible to the bad effects of these drugs that a dose of a drachm a day will within a week produce large rupial-like ulcerations, which so strongly resemble the rupia of syphilis that when I first saw and described them I was for a time completely deceived.

As you patiently add grain by grain to attain the restraining dose, so must you at the end of two years without attacks as slowly withdraw the drug grain by grain.

I am saying nothing about other drugs, but there is one thing I do desire to say. I saw, when young, cases of epilepsy cured by nitrate of silver, but the nitrate of silver had to be given in doses which would astound the therapeutist of to-day in order to bring about the result in question. I recall a case in which I did cure the epilepsy, being a rash young man, by large doses of the silver salt, having previously obtained a written promise that no action would be taken if I blackened the man. He was cured, and blackened.

There is one salt of silver which will not change under light, and that is the ioduret. Whether it will be efficient in epilepsies to bring about good results, or will cause such gastric troubles as to prevent its use, has not been sufficiently tested.

I have avoided the luxury of the relation of personal cases, and beg you to consider that every statement I have made has strong and absolute foundation in observation and well-noted facts.

To turn now to the immediate prevention of individual attacks of epilepsy. I myself believe that epilepsy always originates in sensorial centres with a discharge from these centres, which is or is not recognized by consciousness. Such sensory discharges are referred to exterior organs, as when we have the sense of an aura rising up from the abdomen, or beginning as numbness or what not in the hand, or arising in the form of optical auræ or of olfactory or auditory impressions. In other words, I believe the aura always exists, but is unperceived in most cases, owing to the suddenness with which the motor discharge follows. I want to make this matter clear to you, because I do not think it has been fully enough expressed in this form elsewhere; or, if so, will bear repetition. I regret not to be able to give you all the evidence upon

which it rests, but I think a single statement will make it clear to a set of experts such as are here present, and will make some of you wonder why it has not been more fully recognized. It is supported by the fact that an epileptic having distinct auræ may go on with lessening of the interval between the onset of the auræ and the convulsive attack and loss of consciousness until the time between becomes too brief for memorial registration or any useful intervention. I hope that I make myself clear and that you will perceive the importance of what seems to me to be a novel thought, open to attack, and perhaps to defeat, by larger observation; but so far as treatment is concerned, it was necessary to speak of it.

Before mentioning the use to be made of the auræ and what opportunity they offer in a small percentage of epileptic cases, I want to say a word as to a set of phenomena which have been, I think, improperly classed, especially by Oppenheim, as also being of the nature of auræ. Thus, there are many persons who are habitual epileptics, who, especially after the disease has existed for a considerable time, have within a day before the attack certain definite sensations or conditions, which are occasionally of value in enabling them to anticipate and be ready for the attack. To illustrate: Certain people before an attack, a few hours before or a day before, develop either a condition of slight excitement or a state of sensation of being agreeably well, which the French call *bienaise*, or well-being, to put it in good English. You are familiar with the fact that this feeling occasionally precedes certain headaches. A more distinct symptom is the curious personal odor which in some cases precedes an attack, and may take the unpleasant form of horribly bad breath, which is unfortunately also one of the annoyances due to the use of bromides. This which I speak of now is described as being different, usually as having an acid odor, but the chemistry of odorous emanations has yet to be studied. There are various other forms of the general or local states which precede the aura and the fit, but I do not propose to dwell upon them here. I speak of these prodromes only because the therapeutic opportunities they present are often overlooked.

If now we are to help a person in the few moments which precede the epilepsy, two or three things are necessary, and they unfortunately exist only in a moderate percentage of cases. These are: An aura long enough to permit of something being done, capacity on the part of the sufferer during that time to use this interval, and the discovery of what is the best form of interference. These interferences to be valuable are all, with perhaps one exception, such as affect the sensory stage of the connected series of symptoms called epilepsy. Some of them are as old as knowledge of the disease—that is, such as putting salt on the tongue, a ligature around the arm, and the like. I shall mention only those which are novel in their mode of employment or in kind.

If you have to deal with an epilepsy of Jacksonian type or originating in a sensation confined to one limb, a sudden ligation of that limb will very frequently arrest the attack. How to bring this about when the aura is brief is the question. I succeeded very well in one remarkable case, by having a spring arrangement worn on the left arm and set free to act by pulling a cord which was fastened at the wrist. A sharp pull on this cord released the spring and pretty violently clamped the arm. This usually resulted in checking the attack.

The two other points to which I shall now allude are: First, that a great change in the mode of life sometimes results in curing epilepsy. Thus I have known two cases in which service in a cavalry regiment during the civil war did put an end to epilepsy. I have made all sorts of efforts in the way of diets, starvation, the milk cure, the meat cure, absence of salt, rest, and what not, without much good. Generally the burden of unhappiness is needlessly increased by forbidding tobacco and coffee. I have had the frequent experience known to others that a change of remedy

or locality, such as putting a patient in a hospital to study the every-day phenomena of attack, were followed by long periods of arrest of the disease.

And what of the use of nitrite of amyl in the treatment of the attacks? This, I am perfectly sure, will arrest attacks of epilepsy, if the aura gives time and opportunity. Neither need there be any fear in the use of this drug, although the sensation it causes in the head is alarming. I have seen it pretty recklessly employed by a rough hospital nurse, with the effect of stopping successive attacks in the status epilepticus. When I first used this drug in 1871 (and I was the first to employ it), I personally used it in an attack I witnessed, and was completely satisfied of its extraordinary power. My paper appeared in 1872, but it has since been rediscovered by Crichton Brown and one or two other people, about which I have not further concerned myself.

The condition known as minor epilepsy (petit mal) which sometimes lasts for minutes is not as easy to end by the use of amyl nitrite as is the aura of the greater epilepsy.

I have not dealt here with the reason why the nitrite of amyl cuts short the series of phenomena which accompany the onset of attacks. The great pallor of face which ushers in the fit suggests how it acts, and this alone is sure, that if you can thus or in any way bring on flushing and dilatation of the arterioles, you may so interrupt these sequences as to prevent the storm of convulsive movements which would have followed. Also, it is true that if we can control often enough the occurrence of convulsions, we may lessen the probability of their continuance or recurrence. Apparently we may break up what one crudely calls the convulsive habit.

Finally, there is one other matter which I consider important. It is not my discovery. I do not now remember who told me of it, but it was a physician I met somewhere on a train in New York State. He told me that having been subject to a grave form of epilepsy, preceded by very horrible olfactory subjective odors lasting fifteen or twenty minutes, he discovered that by taking a long inhalation, holding his nose and then forcibly contracting the chest, he could check the progress of the aura and prevent altogether the convulsions which without this measure inevitably followed. He assured me that he had thus succeeded finally, without bromides, in altogether stopping the epilepsy, and he no longer employed or had need to employ the method in question. This is almost my only useful contribution this evening, and I think it worth while to state it, because I have seen a number of patients able to relieve themselves by this means. If you will employ it on yourselves, you will see that it flushes the face, and therefore in all probability flushes the brain just as amyl does, and thus interrupts the sequence of events which it seems must develop in turn before the convulsive symptoms occur. I had a letter last week from a lady who by this means, having a long period (several minutes) of remarkable aura in the forms of rings of light before her eyes, has been able to check all her attacks during a year with one exception. I ought to say that she finds she is thus able to get along with one-third of the quantity of bromide which before was necessary to prevent recurrences, and which left her a wretchedly melancholy person with increasing difficulty of locomotion. I therefore suggest in these cases a moderate amount of bromide, with some effort to use the method in question. It is one which requires a little training.

I think that I have here said everything which it is worth while for me to say, but desire to add that with the exception of these slight hints as to the auræ, I want most to direct attention to the fact that probably *all* attacks have auræ and *all* attacks have a sensory origin.

To conclude, I ask myself and you, what is the effect on the brain cells of excessive use of bromides? I ask also is it not possible that they act locally on the vessels of the sensori-motor areas so as to prevent accumulation of a convulsant substance, and so give time for its slow elimination? My

question is purely hypothetical, but admits of some defense, and in fact epilepsy offers many unanswered questions.

THE MEDICAL TREATMENT OF EPILEPSY.

BY F. X. DERCUM, M.D.,
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The term epilepsy embraces a number of symptom groups which, while closely allied, differ radically from one another as to their pathogenesis. Among them we have first the so-called idiopathic or essential epilepsy; secondly, epilepsy due to the ingestion of poisons, such as alcohol and lead; thirdly, epilepsy the direct or indirect result of infection; fourthly, epilepsy due to gross organic disease of the brain, such as brain tumor; and lastly, epilepsy the result of trauma. Obviously the consideration of the subject in its entirety is unsuited to an evening's discussion, and I will limit that which I have myself to say to a discussion of true epilepsy—*i.e.*, the idiopathic or essential form, the other forms being in reality merely symptomatic disorders.

When we study patients suffering from essential epilepsy, we are at once impressed by the fact that the larger number, if indeed not all, present the earmarks of retarded or aberrant development. It is hardly necessary to call attention to the peculiarities presented by the structures readily accessible to observation, such as the skull, the palate, the teeth, the ears, the limbs, the digits; nor is it necessary to point out that if anomalies, arrests, and deviations are present in surface structures, it is legitimate to infer that they are present in deeper structures as well. I presented many years ago before the Philadelphia Neurological Society a series of twelve brains of confirmed epileptics, all of which presented more or less striking anomalies of convolutions and fissures. It is very probable that other morphological anomalies obtain elsewhere in the organism, and it does no violence to the facts to regard epilepsy in its essential forms as distinctly a morphological disease, as one occurring in defective organisms, organisms in which evolution has been incomplete or aberrant, and in which we have reason to believe that metabolism also is not normal and that the individual suffers from the formation and retention of toxic substances.

Time will not permit of a discussion of the facts bearing upon the theories of the toxicity of epilepsy. Studies in metabolism, as Sarbó[1] points out, while they promise something in the future, have failed to reveal any product of metabolism as the constant accompaniment or cause of epilepsy. However, as is well known, not only the seizures but also the symptoms of the intervallary period strongly suggest a toxic cause. Among the symptoms present during the intervals suggesting toxicity are mental depression and morbidity, emotional irritability, heaviness, slowness of thought, headache, sensations of weakness, and less commonly tremor and muscular twitchings. That, however, convulsive seizures may occur without toxic cause is proven by the convulsions artificially induced by A. J. Parker and myself in our own persons and in those of some of our colleagues. Our experiments were described in a paper read before the Philadelphia Neurological Society in 1884, and were also subsequently demonstrated to a small group of Fellows of the College. The method consisted in bringing about rapid nervous and physical fatigue by special strains, and while toxicity could not have played a rôle in the convulsions so induced, I notwithstanding believe that in the true epileptic convulsion the facts are in favor of toxicity. At any rate, in the treatment of epilepsy the factor of possible if not probable toxicity should receive serious consideration. Again, if in addition it be true that the epileptic is morphologically defective, this fact must for obvious reasons be equally borne in mind.

The treatment divides itself into a general or physiological treatment, and a treatment based upon drugs.

The physiological treatment resolves itself into the following subdivisions: First, treatment directed toward the elimination of waste and toxic substances; second, ex-

ercise; third, diet; fourth, the maintenance of the general physical and mental health as near the physiological level as possible.

Under the first head we should bear in mind that it is important to keep open all the avenues of elimination. The bowels should be opened once or twice daily; the kidneys should be kept active by the free ingestion of water, and the skin should be kept active by tepid sponge bathing or by brief tepid immersion baths followed by a gentle rubbing. The idea of the bath should be not to produce a reaction or a possible tonic effect, but simply to encourage the activity of the skin as an emunctory organ. Baths which produce profound reactions are contraindicated.

Further, it is important, I am convinced, for the patient to spend as much time as possible in the open air in order that proper oxidation of the tissues shall not be impeded. Equally necessary is it for the epileptic to sleep in well-ventilated rooms. Out-of-door sleeping I do not believe to be necessary, though of itself it is not to be decried. Exercise I consider of the utmost importance, but this exercise should be gentle; it should never be violent and should never be of such a character as to surcharge the tissues and fluids of the body with waste products. Excessive exercise does harm. Overfatigue, as is well known, is a direct exciting cause of epileptic seizures. The indication for exercise in epilepsy is, first, that the exercise shall be gentle, and secondly, that it shall be taken in the open air; by it the intake of oxygen is increased, the oxidation of the tissues is promoted, and indirectly in this way elimination. Marked fatigue must always be avoided.

The question of the diet of epileptics is a very difficult one. The diet must be adapted to each individual case. Certain general principles, however, can be considered as established. First, it has been shown that in many cases the seizures are less frequent when the red meats, and perhaps the white meats also, are diminished, and in some cases when they are excluded. For instance, Alt[2] noted in studying his cases of epilepsy that the number of seizures became less pronounced when he restricted his patients to a vegetable diet, and that they diminished most when they were upon a strict milk diet. In children he noted that the attacks became least frequent when the latter were given sterilized milk. Blumhardt[3] noted in twenty-one cases of epilepsy in children that a vegetable diet was followed by marked improvement. However, J. and R. Voisin,[4] basing their conclusion upon clinical experience, maintain that a meat or nitrogenous diet, no matter what the form of the latter, is not capable of increasing the number of attacks, provided the amount is moderate. Rosanoff[5] also concludes that a mixed diet does not exert any more influence upon the attacks than does a purely vegetable diet. He maintains that an exclusive vegetable diet in epileptics is not indicated. He noted, however, that either an excess or deficiency of the proteids had an unfavorable effect upon the attacks. He noticed the most unfavorable effects when there was an excess of proteids and a deficiency of the carbohydrates in the diet. The practical results of his investigations are that we are to give the epileptics as much carbohydrate and fat as they are able to assimilate, and as much proteid as is necessary to the maintenance of the nitrogenous equilibrium, but no more.

Lallement and Rodiet[6] studied in their epileptics the influence of diet on the amount of skatol and indican in the urine, and they compared their results with the results obtained after an ordinary diet. They found that with a vegetable diet there was a marked reduction in the amount of uric acid and chlorides. The indican disappeared almost completely. Skatol was, however, present in the same amount as in the mixed diet. On the resumption of meat, the amount of indican and uric acid again increased. Rodiet[7] noted a favorable effect of the meat-free diet on the mental condition of epileptics; they were less irritable and excitable than on a meat diet. Shanahan[8] insists upon a careful examination of the digestive tract and a study of the metabolism, examination of the bowel movements, and an analysis of a twenty-four-

hour specimen of urine. Baugh[9] claims that a diet poor in the purin bodies is not best for all epileptics, but is appropriate to only a part of them. Certain it is, however, that a rich purin diet exercises an unfavorable effect upon the metabolism and the health of the patient. Rodiet, Lallement, and Roux,[10] who instituted in eleven epileptic women a strict vegetable diet, point out that it is incorrect to attribute the number of the attacks solely to gastrointestinal autointoxication. They point out that the diet must be carefully adapted to the condition of the digestive tract.

In my experience it is wisest in epileptics not to adopt too strict and too rigid a diet. The diet should be a mixed one. It should contain vegetables and milk in liberal amount. It should contain the white meats. The red meats should be given sparingly. I have, however, occasionally found that if in epileptics who have been accustomed to a meat diet, the meat be withdrawn absolutely, the number of the attacks is increased. In other words, some patients will improve with the diminution and others with the absolute withdrawal of the meat. With regard to the carbohydrates, I am myself inclined to adopt a middle course. I do not believe it wise to surcharge the intestinal tract of the patient with starchy foods. My experience is not in accord with that of Rosanoff, that we should give an epileptic as much starch and fat as possible, but that the quantity of starchy food should be moderate in amount. Inasmuch as the starches are the equivalent of sugar and are therefore muscle foods, and inasmuch as the epileptic patient is not to exercise strenuously, the amount of starches indicated is not large; further, starches in large amount favor digestive disturbances. As regards fat, a normal amount of fatty food may be given. As a rule the patient's own inclination can be trusted in this respect.

It goes without saying that in every case digestive difficulties should, as far as possible, be corrected, and especially should free evacuation of the bowels be insisted upon. I am not, however, an adherent of the theory of intestinal intoxication as an explanation of the epileptic seizure. In my own belief the cause of the autointoxication of epilepsy lies far deeper; it is possibly to be sought for in an as yet unexplained disorder of metabolism, possibly a disturbance of some gland of internal secretion.

There can be no doubt that by the carrying out of a rigid hygiene—*i.e.*, by the keeping open of the avenues of elimination, by favoring the oxidation of the tissues, and by the avoidance of an excess of foods which hamper or encumber oxidation and metabolism in general—the number of the seizures is greatly influenced, and this irrespective of the administration of the bromides.

Time will hardly permit of an extended discussion of the occupation of epileptics. That the occupation should be simple in character and not involve nervous overstrain, that it should be carried out in the open air, that it is ideally presented by epileptics who spend their time upon a farm or garden, or in an epileptic colony, there can be no question. Every one of us has noted that nervous overfatigue, that sudden psychic or emotional excitement, may lead to an epileptic attack, and it goes without saying that the life of the epileptic should be made as placid as possible.

There can be no doubt that now and then simple physiological methods of treatment result in a lessening or even a prolonged remission of symptoms. I have had several such experiences. We must bear in mind also that every now and then, though rarely, epileptic attacks cease spontaneously.

In regard to the giving of medicines, I wish to state most emphatically that I am not one of those who decry their use. In drugs we possess a most valuable means for the diminution and often for the control of the seizures. I am of the opinion, based upon a not inconsiderable experience, that the harm done by drugs has been grossly exaggerated. The deterioration noted in an epileptic is properly to be ascribed not to the treatment or drug that he is receiving, but to the progress of the insidious disease from which he suffers. We must remember that epilepsy is not purely a paroxysmal

disease; it is a continuous disease. The epileptic is an epileptic whether he suffers from convulsions or not, and in the interparoxysmal periods he is the same abnormal individual as regards both his morphology and his tissue-changes as he is during his epileptic attacks; in the latter it is merely that a crisis has been reached. Degeneration probably goes on in the interparoxysmal periods as well as at the times of the seizures; though it appears that the frequent occurrence of the latter hastens the process. It is probably true also that the action of the bromides is less harmful than is the frequent occurrence of major attacks, and between two evils it is certainly wisest to choose the least.

The bromides, it will be remembered, were introduced by Laycock in 1853; their introduction constitutes, in my opinion, a veritable epoch in the history of therapeutics. To decry their usefulness is to deny the cumulative experience of almost sixty years. It is not, however, my intention to discuss the efficacy of bromides in epilepsy, but rather the important modification of the treatment introduced by Richet and Toulouse[11] in 1899.

We have all noted that there is in patients to whom we give bromides a tendency to bromide retention. This was long ago noted by Laudenheimer, who in studying a patient observed that of 80 grammes of bromide administered only 35 grammes were recovered from the urine. Of course some of the bromide must have been eliminated in other ways than by the kidney, yet the amount so eliminated must have been small. That there is a tendency to the retention of the bromides there can be no doubt, and this, as I have just stated, is in keeping with ordinary experience. Not infrequently, however, we fail to produce an adequate impression. The likelihood of such failure is greatly reduced if we institute the procedure of Richet and Toulouse, namely, that of chloride of sodium withdrawal. There seems to be an interrelation between the retention of the bromides and the elimination of the chlorides, and *vice versa*. Bromide accumulation occurs in proportion to the amount of the chloride of sodium withdrawn. Again, it would appear that the bromides are more readily eliminated after chloride of sodium is resumed. Ulrich[12] has shown experimentally that the elimination of the bromides in animals is enhanced by the giving of table salt. He also claims that the table salt rapidly removed the motor, sensory, and psychic phenomena of acute bromism. Bromide skin affections, he maintains, are rapidly dispersed by the administration of sodium chloride. He regards table salt as an antidote for bromism. If to an epileptic who is bromized and whose attacks have been controlled we give table salt, epileptic convulsions may recur. Frey[13] also has shown experimentally upon animals that there is a relationship between the elimination of the bromides and chlorides in the urine, and that a similar relationship can be demonstrated in the presence of these salts in the blood. The withdrawal of the sodium chloride always caused a retention of the sodium bromide. Bromide always acted more promptly when the chloride had been withdrawn. The resumption of the table salt by the animal at once hastened the elimination of the bromide. *Vice versa,* the administration of the bromide causes the amount of chloride in the urine to be increased. The kidney, Frey states, seems to make no distinction between the elimination of the bromine and chlorine. It would appear that an excess of either or both cannot be retained.

A great many observers have noted beneficial results from the withdrawal of the sodium chloride in the bromide treatment of epilepsy. Among these may be mentioned J. Voisin, R. Voisin, and Krantz.[14] Mirallié[15] has also had very favorable experience with this method. He believes that the withdrawal of table salt from the diet makes the nerve cells more sensitive to the action of the bromide. Lambranzi[16] concludes, after a very careful and thorough study, that the method results in the great majority of cases in a decided reduction in the number and intensity of the attacks and at times causes them to disap-

pear entirely. He believes that the psychic condition of the epileptics is in the intervals of the seizures also beneficially influenced, and he points out that the extension of the treatment over a long time, for example three months, produces no unfavorable effect. Voisin and Krantz[17] weighed their patients and noted that there was at first, under salt deprivation, almost always a diminution in the weight of the patient, but that this loss of weight at once disappeared when salt was resumed. The practical point resulting is that if in the persistent withdrawal of the salt we find a diminution of the body weight, this is to be looked upon as an impairment of nutrition, which indicates a cessation of the salt deprivation treatment.

Kinberg[18] has published the results of thirty cases in which he employed the Richet-Toulouse method. He maintains that the treatment lessens the number and intensity of the attacks and tends to prevent the recurrence of the status epilepticus; secondly, that it often exerts a beneficial influence upon the mental state, and in this way prevents the occurrence of states of confusion and delirium. He believes that the method is contraindicated when there is disease of the heart, nephritis, emphysema, or adiposis; also if the patient lose steadily in weight the method is to be abandoned. Hoppe[19] points out that the bromides only become efficacious after they become retained, and dwells upon the importance of salt withdrawal. Muskens[20] treated in all 180 patients, among them 40 inveterate cases. Muskens believes that disease of the heart muscle constitutes a contraindication to salt withdrawal. Turner[21] out of eight cases noted a favorable result in five. In three this persisted for three months after a return to an ordinary sodium-chloride-containing diet. In three cases he noted an increase in the number of petit mal attacks. He did not observe any improvement in the psychic symptoms. The chief disadvantage of the treatment he thinks lies in its monotony.

J. and R. Voisin and Rendu[22] recommend a modified method of the Richet-Toulouse method. They give the patients for short periods small doses of bromide, then for short periods large doses of the bromide, both with the usual salt-containing nourishment. Then these periods are followed by equal periods of salt-free diet, but without the exhibition of the bromide salts. This modification does not appeal to me and I see no advantage in it.

Personally I have made use for some years of sodium chloride withdrawal and I share the opinions as to its value. The patient as a rule becomes rapidly accustomed to the absence of the salt. After a time some patients begin to crave the salt. If so, salt may for a short time be permitted, but later again withdrawn. If the prohibition of the salt be too radical, there may result a marked loss of appetite and corresponding loss of weight. As in all other methods employed in diseases chronic and essentially incurable, the taking of the middle course, not too extreme in either direction, yields in the long run the best results. Measures such as the addition of bromides to the food itself, as, for instance, in the baking of bromide bread, so-called bromopan, I do not consider either necessary or advisable.

Other points in regard to the use of the bromides may be summarized as follows: first, it is very important to use them early and in sufficient dose to control the seizures. It is a fact in accord with common experience that early in a case attacks can be more readily suppressed and controlled than later, and it should be our aim to prevent if possible by prompt and vigorous early measures the establishment of what may be called the convulsive habit. Secondly, the bromides should be given in sufficient dose and for a prolonged time. Gradually, especially in cases in which the general physiological plan of treatment already outlined is carried out, the dose may be diminished or even suspended for a time. We should bear in mind that the sudden leaving off of the bromide is unsafe.

An important point, I believe, in the administration of the bromides is to combine them with one of the glycerophosphate salts,

preferably sodium glycerophosphate. There is an increased waste of phosphorus in epileptics, and some such procedure would seem to be indicated. In my own experience the combination of the sodium glycerophosphate has a beneficial action. Under no circumstances can it do any harm.

The Flechsig method of treatment hardly merits special consideration. It consists in the administration of opium in increasing doses at intervals during the day for a period of several weeks, five or six, after which time the opium is suddenly withdrawn and bromide given in full doses. There can be no doubt that in some cases in which the bromides fail to control the seizures, the Flechsig method proves efficient. I have on a few occasions, in bad cases, made use of it with satisfactory results for the time being.

Time will not permit of the discussion of the numerous other drugs employed in epilepsy. Of not one can it be said that they equal the bromides in value, and one only do I deem worthy of special mention, and that is thyroid extract. Thyroid extract appears to have a real though limited value. Browning, Osborne, and Sajous have spoken of its use in suitable cases. As far as I am able to judge, it is in epileptic children with rather marked stigmata of arrest, with signs pointing to possible thyroid deficiency, that thyroid substance is valuable. It is occasionally valuable, however, in cases in which these stigmata are not pronounced. I think it extremely probable that its usefulness is to be ascribed to an increased oxidation of the tissues and a consequent destruction of toxic materials. It should be given in small doses over long periods of time. Large doses probably do harm—indeed, they may add to the frequency of the seizures. Beneficial effects cannot be looked for save after prolonged administration. The seizures should in the meantime be controlled by bromides; sooner or later in given cases it will be found that the dose of the bromide can be greatly diminished and even for a time suspended. An interesting point that possibly has some bearing upon the use of thyroid extract in the control or diminution of epileptic seizures and the possible rôle which increased oxidation plays in such a process, is the well-known clinical fact that in epileptics who suffer from a febrile infection, and in whom there is for the time being an increased oxidation of the tissues, no epileptic convulsions occur. It has been my own observation repeatedly that when an epileptic suffers from an attack of typhoid fever for instance, or indeed from any of the other exanthemata, seizures are absent during the febrile period and frequently for some time thereafter.

Bearing upon the possible rôle of the internal secretions in the pathology of epilepsy, I have recently had skiagraphed a number of my epileptics with very interesting results in regard to the size and shape of the sella turcica. In several of the skiagraphs the sella turcica was shown to be greatly enlarged, leaving no doubt as to an increase in the size of the pituitary body; others again revealed marked variations in size and conformation which appeared to be in excess of the variations found in normal individuals. These observations, necessarily incomplete, suggesting, however, very strongly disease of the pituitary in epilepsy, would justify the trial of pituitrin. Certainly in so distressing and unpromising an affection as epilepsy every clue should be followed.

I am entirely in accord with Dr. Mitchell as to the importance of determining the presence of an aura. Often too little stress is laid upon this fact, and yet it is a matter of long experience that a knowledge of the aura frequently enables us to abort the attacks by various expedients; of some of which Dr. Mitchell has spoken. I myself regard the aura as a sensory discharge which begins not in the periphery to which the sensation happens to be referred, but in a discharge which begins in a sensory area of the cortex; from such a sensory area the discharge travels either directly or by association fibers to a motor area, and arriving there a motor discharge, a convulsion, takes place. The question arises how does a sudden constriction of a limb, in which an

aura is experienced, prevent the epileptic seizure? It is very probable that the constriction arrests nothing passing up the limb, but that instead it causes an impression to be sent to the brain into the corresponding sensory area of the limb, and for the time being arrests or changes the molecular movements which have started there and which would otherwise eventuate in a fully developed epileptic discharge. It is a not uncommon experience that a patient in whom an attack begins with an aura in a hand or finger can sometimes stop the attack by striking his hand or finger sharply against some solid object, such as a chair, table, or wall. No constriction is practiced in such a case, and clearly a theory of a substituted sensory change is most in keeping with the facts.

Not only will the recognition of the aura permit of the use of various mechanical or physiological expedients, but it will also give us the opportunity of using amyl nitrite, a remedy first employed by Dr. Mitchell, which I fear we do not use as frequently to-day as we used to, and which is certainly often efficacious in enabling us to abort attacks.

In regard to the arrest or abortion of attacks, especially by mechanical procedures, my experience has led me to the conclusion that this can be accomplished for a time only, and that the impulse or tendency to the convulsion sooner or later becomes so great that after a while all artificial barriers are broken down and the convulsion takes place. It would also seem that attacks checked by mechanical means or even by nitrite of amyl become cumulative—that is, when attacks finally occur, they are more severe and may occur in groups. Whether actual status epilepticus can be provoked under such conditions I do not know, but I would not deem it impossible. Again, as is well known, a patient in whom convulsions have for a long time been suppressed sometimes suffers from vague and often very distressing sensations—*e.g.*, depression, exhaustion, pressure sensations about the head, fear, aching in the trunk, limbs or abdomen. Occasionally the patient himself attributes these sensations to the fact of not having had a seizure. I remember one of my patients, in whom I was successful in suppressing the attacks for a long time by small doses of chloretone, telling me that she would much rather not take the remedy and have an attack than continue feeling so badly as she did. In certain cases an attack seems to be followed by an actual feeling of relief.

Together with Dr. Mitchell, I do not regard the symptoms which precede an attack sometimes for many hours as classifiable with the auræ. An aura is essentially and intrinsically a part of the epileptic attack. It is merely the sensory portion of the general cortical discharge. The preliminary symptoms of headache, depression, or other vague disagreeable sensations sometimes experienced by epileptics for several hours or a day before a seizure are possibly to be referred to an increased degree of toxicity, and are in their way analogous to the symptoms which sometimes precede an attack of migraine or in other patients an outburst of hysteria. They should suggest to us the use of a saline purge, perhaps a diminution of the food, or a more active administration of the bromide.

The toxicity of epilepsy has more than once suggested a serum method of treatment, but the failure of Ceni's attempt in this direction is so recent that it needs only to be mentioned. Attempts at the actual cure of epilepsy have thus far failed, and perhaps this is no reproach to our profession. We have to deal, it must be remembered, with an organism for the most part badly put together and intrinsically defective.

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THE SURGICAL TREATMENT OF EPILEPSY.

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It is now nearly twenty-five years since I began assisting Dr. Keen in his cerebral surgery, and during these many years I have had the opportunity of seeing a vast number of cases of epilepsy and of operating myself upon a great many patients.

Epilepsies of every variety were brought to Dr. Keen, and for a time we hit almost every head that came in our way.

At first, and indeed at all times, the purely surgical results, the carpenter work if I may use such a term, were brilliant, so brilliant in fact that we became most enthusiastic and believed that in surgery the long-looked-for treatment of epilepsy had been found. As our experience ripened and sufficient time elapsed for us to see the real neurological results, our enthusiasm waned, our disappointments were many, and finally we were compelled to modify our opinions and confine this method of treatment to a very limited number of carefully selected cases.

The needs for operation in traumatic epilepsy are now well recognied by all surgeons and neurologists, and this is particularly so where there has been distinct injury to the skull producing a scar or depression of bone over the motor area, and when the seizures are focal in character.

It is quite generally believed also that in cases of injury producing persistent headache, as well as in certain mental disturbances, an operation, even if only exploratory in character, is justifiable and at times imperative.

In the essential epilepsy of idiopathic or non-traumatic type, when the attacks are general and without local onset, no operation whatever should be undertaken. No permanent benefit can be expected, and it may and frequently does produce much harm.

Almost anything which is done to these patients may for a short time seem to modify the character and frequency of their attacks. Simple etherization, a fall, or even hitting them on the head with a club may apparently be beneficial.

Idiopathic epilepsy with focal symptoms, however, if seen early should always be operated upon, the dura incised, and the surface of the brain examined carefully for evidence of cyst, new growth, or localized meningeal inflammation.

When a focal epilepsy due to gross brain disease develops, all surgeons are united in advising operation.

The earlier the operation the better the results, for after two years the associated fibers are almost certain to have undergone degeneration and little can then be promised.

The dura must be opened and the surface of the brain examined by sight and touch. If there be a fracture of the inner table of the skull or an overgrowth of bone, an organized blood-cot, a tumor, a cyst, or other evidences of pathological changes such as adhesions between the bone or dura and the surface of the brain, efforts must be made to remove the source of irritation.

I do not think we are now justified in excising the center from the convolution of the brain with any expectation of benefiting the patient, unless there be distinct evidence of disease.

If there be history of trauma followed by epilepsy which has a focal origin, even if the center from which the impulse arises is not beneath the scar, the surgeon should explore at the seat of the injury first and later over the discharging center.

When the injury has been over the motor area the results from operative interference promise much more than when the injury is over the sensory region.

While the value of operations for epilepsy has been greatly exaggerated, and the results in the vast majority of cases disappointing, it does not follow that surgical intervention should be abandoned, but rather should be confined to carefully selected cases after the most thorough study by both neurologist and surgeon. Occasionally great benefit may result and unexpected pathological conditions be found which admit of removal.

A wide opening should always be made in the skull, generally by an osteoplastic flap, to enable the surface of the brain to be examined.

Dr. J. Chalmers Da Costa (*Medicine*, February, 1904) in an admirable article on the "Surgical Treatment of Epilepsy" gives a classification of this disease which is of the greatest value, and one which I have studied with much profit.

THE MEDICAL TREATMENT OF EPILEPSY.

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In presenting this paper on the medical treatment of epilepsy, I can but endeavor to review concisely what has been done in the past in the therapeutics of this condition and summarize what, to me, seems to be the best general method of treatment now known. Naturally, many drugs and methods have had their day and then passed into deserved oblivion. Others, although long known to the profession, have not always received the proper recognition which their importance should have gained for them. In a paper of this length many of these things must necessarily be referred to in the briefest manner. The surgical treatment of the disorder will, I believe, be discussed by other speakers of the evening.

No theory ever put forward to explain the origin of epilepsy has been proved in such a way that an exact scientific treatment could be pursued. Thus empiricism continues naturally to play a major part in the therapeutics of the condition.

If we accept the hypothesis that epilepsy is due to the absence of a protoplasmic factor that determines complete nervous development, we are in a position where, if we expect to arrest or cure, we must either supply this missing factor or so modify the relation between the factors present as to have the functions of the organism as nearly normal as possible. The former is impossible, at least with our present knowledge; the latter seems attainable to a certain degree.

To assign bacterial infection as the exciting cause of the symptoms of epilepsy, as did Bra, seems not worth giving even consideration to. Much more credible evidence exists that an abnormal or perverted metabolic activity is present in the epileptic in consequence of which certain chemical substances, either from the gastrointestinal tract or from one or more of such glands as the pituitary, adrenal, parathyroid, thyroid, pancreas, or similar structure, become active toxic agents, as a result of whose influence on the central nervous system the phenomena of epilepsy appear.

Research has thus far failed to firmly establish a logical chain of facts explaining beyond question this supposed perversion of function in its relation to epilepsy. If time permits the unveiling of accurate knowledge covering these matters, we can look forward to our having at some future period a specific treatment for what we now designate as idiopathic epilepsy, or more properly speaking, epilepsies.

Although the underlying factors, such as developmental defects or changes consequent upon early meningitis or encephalitis, whether due to injury at birth or subsequently, may be permanent, the actual exciting cause of the seizures may be elimi-

nated by either preventing its formation or by rendering negative its pernicious influence.

In comparing the results obtained from treatment in institutions and that outside, we must remember that the majority of the former cases are ordinarily of several years' duration before admission, whereas many of the latter are observed shortly after the onset of the condition, and, other things being equal, are of a more favorable type for treatment.

Camp[1] states that a cure of epilepsy may be reasonably expected "when the primary cause is known and removable." How true this is. We must confess, however, that in the great majority of cases it is impossible to accurately ascertain this primary cause.

It has long been remarked that in the treatment of epilepsy all remedies do good for a time, this being due in part to the psychic influence on the patient. It is a common experience to observe, after a period of freedom from the disease that varies from weeks to months, and while treatment is being faithfully employed, to have the symptoms recur.

Epilepsy is such a broadly inclusive term that it involves conditions which differ markedly so far as their response to treatment is concerned. Where the symptoms are due to focal organic disease, overindulgence in alcohol, arteriosclerosis, etc., it is logical to assume that early treatment of a proper nature may reasonably be expected to bring forth better results than where the patient has a generally defective make-up, a paralysis of long standing, or some other chronic condition.

We all know that frequently the symptoms of epilepsy have continued unrecognized for many years, thus permitting the convulsive habit to be firmly established. Idiopathic epilepsy, appearing as it does in 85 per cent of all cases, before the twentieth year, shows itself as a disorder of the developmental period. This is another reason why permanent degenerative changes in the nervous system are the rule and not the exception.

In outlining a course of treatment for an epileptic, the physician must impress upon him and his family that inasmuch as epilepsy is a chronic disorder, the special treatment must continue over a long period, and that in fact the patient must, during the balance of his days, live according to certain closely drawn rules relating to hygiene and diet. Unless earnest coöperation is secured for the carrying out of these details, one cannot expect to obtain the desired results.

The physician himself must not relax his vigilance in the following up of his epileptic patients. Perseverance is indeed a virtue in the treatment of this condition.

The readjusting of the patient's mode of life is ofttimes a difficult process and, of course, in many cases cannot be as complete as one would wish for. The essential changes indicated in the individual case must, however, be insisted upon or it is useless to attempt to treat the patient.

When the occupation, means of recreation, the bathing, diet, and hours of sleep have been properly regulated, a long stride has been made toward assisting the individual in acquiring a more stable functioning of his central nervous system. The initial effort required to bring about coöperation must be well tinged with psychic influence, without which our means of treatment of nervous disorders would be small indeed.

The psychical influence in the treatment of epilepsy is of considerable importance, as a belief aroused on the part of the patient that he is to be helped will pave the way for a serious effort being made to carry out whatever treatment may be prescribed.

Hope and confidence must be aroused in your patients before you can expect to secure beneficial results from your treatment.

Prophylaxis in general must consist in continued efforts being made toward arousing a public sentiment which will demand the segregation at least of the epileptic who is mentally defective. We can never hope to have isolated the small percentage of epileptics whose mentality has not deteriorated. Before, however, anything can be

accomplished in this general direction, physicians as a whole must be made to realize the results of the mating of defectives. The average practitioner does not appear to grasp the seriousness of this problem; such being true, how can we expect the general public to understand these matters as they should?

Relative to prophylaxis as applied to the individual, I cannot reiterate too much the plea that all convulsions in infancy and childhood be recognized as very serious occurrences, so much so that such a child requires careful supervision ever after. Parents and those who have to do with the raising of children must be brought to appreciate the great importance of giving proper attention to the diet and hygiene of a child in whom even one convulsion has occurred. Such care would, in many instances, result in these children developing into strong, healthy adults with no evidence of an unstable nervous system. Lack of such attention too often means recurrence of convulsions, and in consequence a progressive deterioration of the unfortunate individual.

With the exception of the sedative effect obtained by the discovery of the effect of the bromides, we may say the general principles of treatment of epilepsy were recognized thousands of years ago. The importance of exercise, bathing, and the careful regulation of the diet was recognized by the earliest writers on the subject —in fact, so carefully were these methods laid down that we cannot at this day materially improve upon them.

We must confess that the medicinal treatment of epilepsy is essentially ameliorative and, comparatively speaking, of minor importance when one considers the value of strict dietetic and hygienic measures.

It is a matter of common observation that the natural tendency of epilepsy is to progress, rarely to cease spontaneously, after it is well established.

It has been well said that the subject of epilepsy is one that embraces, perhaps more than any other limited department of medicine, the whole range of therapeutics. Sieveking,[2] a writer of sixty years ago, stated: "In epilepsy the results have been, if not barren, yet unsatisfactory; and still the disorder constantly attracts new inquirers, each anxious that he may succeed in lifting the veil that shrouds the mystery. We are justified in expecting more decided benefit from a full development of our hygienic resources in combating epilepsy than by reiterated experiments with drugs. Epilepsy is a disease of the whole man and not of any one organ or system of organs alone. In many instances there is no doubt that the result of treatment is merely a temporary arrest or postponement of the affection, which is erroneously regarded as a cure."

Sieveking also tells us that "there is not a substance in the materia medica, there is scarcely a substance in the world, capable of passing through the gullet of man, that has not at one time or other enjoyed the reputation of being antiepileptic."

I must agree with Dr. A. J. Rosanoff,[3] who, after making dietary tests, concluded that the epileptic should receive the largest amount of carbohydrates and fats that he can properly assimilate and the smallest amount of proteids compatible with the preservation of the nitrogenous equilibrium —that is to say, the amount of nitrogen ingested must not be allowed to fall below the amount excreted.

I scarcely need to refer further to the details of arranging a diet for the individual case. What one epileptic may use with impunity may be very harmful to another. The purin-free diet advocated by Turner and others has some value perhaps, but I cannot see that the results following its use differ from the ordinary restricted diet. It is easier to restrict the diet and to regulate the action of the bowels than to treat by intestinal antiseptics, although the latter may have some place.

The history of the use of the bromides from Sir Charles Lacock's advocacy of them in 1857 for use in epilepsy up to the present is so well known that I will not review it at this time.

The bromides' only use is to diminish

the frequency and severity of seizures. The removal of the instability of the brain, if such is possible, must be accomplished by other methods. I would repeat that a careful regulation of the method of living is more essential in the treatment of epilepsy than is medicine. The bromides in epilepsy might be compared to a muffler or governor to control temporarily.

How frequently has the following observation of Peterson[4] been overlooked: "In order to give scientific value to any new therapeutic measure in epilepsy, it is necessary to show that the patient has not been using bromides for a long time before the experiment in the new treatment has been undertaken."

Sterile solutions of the bromides have been used hypodermically in status epilepticus, but to me this has always appeared to be the heroic use of a measure whose effect does not warrant such a procedure, as the control of the seizures, when such is possible, can be gained by other methods.

It has been aptly said that the use of bromides results in a chemical restraint of nerve cells. It has also been asserted that if the bromide is continued over a long period, chromatolysis of cortical cells and even dissolution may occur.

Delirium as a result of the overuse of the bromides is a symptom which, when it occurs, may not be ascribed to its proper source.

I will but mention hypochlorization, as Toulouse's method of administering the bromides is too well established to need my commendation.

For those having seizures shortly after arising, it would be well to give a sedative immediately upon awakening, having the patient take a light breakfast in bed and remain lying down for from one-half to one hour. After this period the readjustment of the cerebral conditions from their state during sleep to that during waking hours has occurred, and the patient may arise.

Where seizures occur during the first few hours of the sleep state, the sedative should be given two or three hours before retiring and following a light supper.

In many cases seizures should be understood as occurring not necessarily at night but *during sleep,* whether day or night.

Bromine may be administered as one of its salts or a combination of the same, being well diluted. The numerous vehicles prescribed disguise the taste of the salt in varying degrees. More elegant preparations of bromine are bromipin, bromoglidine, brometone, sabromin, brovalol, etc. In my experience sodium bromide is the most satisfactory salt to prescribe.

Vance[5] divided cases into two groups as to ophthalmoscopic findings: (1) One with vascular fulness, (2) the other with anemia of the retinal vessels; each finding showing, according to him, the state of circulation in the brain—*i.e.,* directly opposite conditions may give rise to the same symptoms. He claimed that bromides proved very efficacious where retinal congestion appeared and that bromides aggravated cases showing retinal anemia. In anemic retinal cases following several paroxysms, the retinal veins became dilated and tortuous; the arteries, however, remained unusually small.

The treatment of the epileptiform seizures, due apparently to arteriosclerotic changes in the cerebral vessels, consists in proper rearrangement of the habits of the individual, excluding so far as possible everything which would tend to raise the blood-pressure in these vessels. Iodides have a place in the treatment of this type, but of greatest importance is the regulation of exercise, diet, and hours of rest.

In symptomatic epilepsy appearing in adult life, the first convulsion serves, oftimes, as a warning and leads to careful treatment. Are such convulsions indicative of a latent convulsive tendency? The threshold value of stimuli necessary to induce convulsive phenomena must be lower in a part at least of these individuals. A great number of persons who never manifest such symptoms have as marked an arteriosclerosis in comparatively early life, and are also alcoholic or syphilitic or both.

Epileptiform symptoms appearing during the course of some thyroid disturbance resulting in insufficiency of secretion of that gland might be expected to be relieved when thyroid extract was administered in

proper dosage. To make a broad claim that thyroid extract should be given to all epileptics is absurd.

When epilepsy appears after twenty years of age, syphilis must always be considered in searching for the exciting cause.

There is no pathognomonic sign peculiar to syphilitic epilepsy except possibly the Wassermann reaction; and even this, strictly speaking, has been obtained in leprosy, etc. Partial convulsions are presumably evidence of the seat of the lesion, being the expression of definite localization and thus prove symptomatic. In some cases, however, it would seem that the centers in which the convulsion seems to originate are affected from distant parts. These symptoms, as just stated, occur after the usual age of onset of idiopathic epilepsy and may result from syphilitic dyscrasia.

When a positive Wassermann reaction has been obtained in such patients, salvarsan should be at once administered, preferably by the intravenous route. Mercurial treatment to supplement this may be found necessary. After a varying period another Wassermann test should be made, and if positive, another dose of salvarsan given.

A relative constipation, or a day late to stool, as it has been expressed, is common to the majority of epileptics. The excretion of waste products is incomplete, in consequence of which, in the epileptic, we have a state which, added to the hypersensitive nervous system, results in the symptoms known to us as epileptic. Drastic catharsis has been decried, but from our experience at Craig Colony it is most valuable.

The moral treatment to inculcate self-control, personal discipline, and strict rules of conduct is of the utmost importance in the therapeutics of nervous disorders, consequently holding true of the epilepsies. Worry and stress act in producing an increase in the number of seizures. The psychical condition so influences sleep, digestion, elimination, etc., that the patient is brought below par, and this manifests itself in these persons by the recurring seizures. It is a well-known fact that psychical disturbances—*e.g.*, worry over examinations, business matters, etc.—may create in supposedly normal individuals an upheaval in the functions of the alimentary tract, circulatory system, etc.

As to the question of the marriage of an epileptic there can to my mind be but one answer—and that an emphatic "No." The type of offspring of such marriages, the desertions which result, the extra burden on the family of the afflicted one, who as time goes on becomes less able to take a place in society, are every-day occurrences and make one ask, How long will these matings continue to be permitted?

When we are consulted by epileptics who hold positions of responsibility where the lives of others are under their control—*e.g.*, railroad employees—we should in justice to society recommend a change of occupation.

Delasiauve in 1849 recommended the establishment of institutions for epileptics where a hygienic as well as a medical plan of treatment might be pursued. He calls attention to the fact that every infraction of temperance will induce a relapse. A peaceable and quiet life is best suited to the epileptic, exercise being very salutary. Galen and Hippocrates laid stress on bodily exercise. The history of the development of the public care of the epileptic is so well known that I will not revert to it at this time.

Silvestri,[6] comparing the results obtained from animal experimentation with clinical experiences, concludes that a lack of calcium is a prominent factor in the production of convulsions, and that supplying large amounts of calcium may render inactive the substance causing the convulsion.

Some observers report excellent results from the use of calcium lactate; others obtained no beneficial effects. At Craig Colony our experience was the latter one. It has been claimed that the efficacy of milk diet has been due to the increased amount of calcium thus brought into the system.

For the aborting of seizures great results have been claimed to be obtained by inhalations of nitrite of amyl to so modify the cerebral circulation by producing a dilatation of the vessels as to abort seizures. I have seen no beneficial results from other alleged methods of aborting seizures. It is

my opinion that in such instances the seizures were of an incomplete type, and in consequence the apparent effect of the abortive measure was obtained.

The serum treatment advocated by Ceni, Mazzei, etc., has not proved to have the value claimed for it.

Our experience at the Craig Colony with female epileptics leads us to conclude that the alleged relation between the menstrual function and seizures is largely overdrawn. In several hundred cases it was found that there was no apparent connection between the two conditions. In a few cases mild seizures seemed somewhat more frequent at the menstrual periods than during other parts of the month, and in a few the seizures occurred just before or after menstruation.

The fitting of glasses, the correction of dental abnormalities, and other similar corrective measures are of value in that they tend to place the individual in a more normal state of health. It goes without saying that an ophthalmoscopic examination should be made in all cases. I have yet to be convinced that genuine epilepsy can be completely arrested by the correction of refractive errors or the removal of an unerupted tooth.

The importance of hydrotherapy in epilepsy is not always appreciated. In a general way it is useful for its tonic effect. In a particular sense it is of value to bring about a greater activity of the skin and thus indirectly relieving the kidneys from part of their load of elimination.

Enemata given frequently and using large amounts of water are exceedingly useful in cleaning out the torpid lower intestine. The quantities of fecal matter which accumulate in the colon of many epileptics seems remarkable. In serial attacks and status epilepticus the colonic flushing is of the utmost importance. Its earlier use would in many cases have prevented the status.

Owing to the tendency of many epileptics to turn on their face during nocturnal seizures, they should use a small hair pillow, or better, have them accustom themselves to do without a pillow.

The accidents and injuries to which epileptics are exposed as a consequence of their disorder are multitudinous. Some of them will occur despite every precaution.

The school work of the epileptic child should be largely manual in nature. An important feature of all school work is of course the acquirement of method in doing things, or to express it in another way, the training along disciplinary lines. The teacher of the epileptic child requires a larger stock of tact and perseverance than perhaps with any other special class. I have seen many cases in which regular school work seemed to hold in abeyance, perhaps preventing, the mental deterioration so characteristic of epilepsy.

I wish to emphasize the fact that suitable occupation for the epileptic is of prime importance. In this connection it is of interest to refer to the theory presented by Spratling that products from muscular action are capable of uniting with the unknown epileptic toxin and of rendering it inert. This might explain beneficial results obtained from properly regulated out-of-door exercise.

In the treatment of the special conditions such as status epilepticus, serial seizures, mental disturbances, etc., eliminative, sedative and supportive measures, with careful attention to nursing, are indicated.

To summarize: The principles of treatment of the epileptic are good, nourishing diet, sufficient exercise out-of-doors, a proper occupation well balanced by a suitable amount of recreation, sleeping in a well-ventilated room, or better still out-of-doors, a regular amount of sleep, retiring early, avoidance of undue excitement or cause for worry, a minimum of medication, regular and frequent bathing, careful attention given to the organs of elimination. The confirmed epileptic should, without exception, live in the special institution where he is with his kind, and in consequence can be permitted privileges not available in the outside world. The seizures and mental status must both be considered in making the prognosis. Seizures may be controlled, but a mind which has deteriorated cannot be restored.

There is no more justification for any physician to definitely promise any epileptic

he can be completely cured, to never have a return of seizures, than there would be in telling a patient who had recovered from pneumonia that he would never have another attack of that disease.

Pastor von Bodelschwingh, of Bielefeld, expresses it as his opinion that absolute recovery of the epileptic is rare, and that to consider an epileptic as recovered there must be a perfect restoration of the psychic functions as well as a cessation of seizures.

We have admitted to the Craig Colony for Epileptics during the sixteen years it has been established some 3460 patients. Some have remained for a very short time, others for the entire period; the average number have been with us for from six months to two years. There have been discharged during this same period as recovered 51 cases, and as improved 553, from a total of 2125 discharges. The percentage of recoveries, less than two per cent of the total number under treatment, is observed to be low, but to me no lower than what must be expected with our present knowledge of the epilepsies and the great number with the incubus of hereditary defect of the central nervous system.

I may appear, perhaps, too pessimistic, but so many writers present such glowing reports of cures of epileptics that we who are familiar with the institutional cases cannot but be filled with wonder at the results, and conclude that the class of cases described are of an entirely different nature from those seen in the special institutions. Spontaneous arrests occur infrequently, and are usually in cases which have had no special treatment other than the regular institutional life. In some alleged cases of cure one is justified in questioning the accuracy of diagnosis.

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PERSONAL OBSERVATIONS AND DEDUCTIONS AS TO THE PATHOGENESIS AND SURGICAL TREATMENT OF EPILEPSY, BASED UPON A SERIES OF SIXTY-THREE CASES.

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To present a paper on the surgical treatment of epilepsy to a scientific body requires a word of apology, at least for the antiquity of the theme. I should hesitate to mention the date when surgeons first busied themselves with the problem, but it was a long while ago. And yet despite the many years of observation, the present status of surgical therapy in epilepsy is not altogether satisfactory, be it the fault of the surgeon, the neurologist, or the disease. So far as I know there is not to be found in surgical problems any quite analogous to that of epilepsy. Surgery is more or less of an exact science; pathology also is more or less of an exact science; when an organ is the seat of a lesion the pathological nature of which is thoroughly understood, and where the initial surgical experience would seem to indicate that that lesion may be favorably influenced by surgical therapy, we have a combination of facts which form a tentative basis upon which to formulate what appears to be a rational mode of treatment, and it is not long before the surgical profession proves the validity or the unreliability of earlier claims, and the operative treatment becomes a conventional mode of procedure subject to subsequent revisions or modifications or is altogether discarded.

The history of the surgical treatment of gastric and duodenal ulcer, of lesions of the biliary passages, as of many other lesions of the digestive tract, may be cited as an instance of the surgeon's invasion into a new field and of his gradual mastery of the problem by a steady but progressive movement in each step of which distinct advances are made. And one could cite innumerable instances of the extraordinary conquests in the surgery of the past two decades. But with epilepsy we must acknowledge at the outset a very checkered career. There have been waves of en-

thusiasm, followed by intervals of indifference, and at no time an entire unanimity of opinion as to the proper course of procedure. Were it not for the fact that we are dealing in most instances with an otherwise hopeless disease, and that at least in a small percentage of cases the patients have been altogether or partially relieved, surgeons would have abandoned the field long ago.

In the preparation of this paper at the outset I was somewhat skeptical as to the value of surgical treatment, and was agreeably surprised to find upon investigating my records that of 25 cases operated upon more than three years ago the results in 7, or 28 per cent, were more than satisfactory. Two of these were markedly improved, and five are virtual recoveries. These cases will be referred to more at length further on.

To what should we attribute the rather chaotic situation as it exists to-day and the repeated failures to discover some mode of procedure which will receive universal recognition? To my way of thinking it is due very largely to our lack of precise knowledge of the nature of the disease with which we are dealing, and to the fact that the treatment whatever it may be has been worked out rather on old-fashioned, empirical lines than from an exact understanding of the true nature of the disease.

We have been told that in cases of so-called essential epilepsy there is no demonstrable lesion of the cortex either macroscopic or microscopic, and that in cases of focal or Jacksonian epilepsy there is frequently a focal lesion, but this is not altogether true—at least there are too many exceptions to warrant so positive a statement, for there are cases of epilepsy focal in character in which the lesion is not focal, but diffuse in type, as well as those in which we fail to find any lesion whatsoever; and again there are cases of general or essential epilepsy in which we find lesions quite similar to those in focal epilepsy (Fig. 1).

Inasmuch as every principle of successful surgical therapy is founded upon an intimate familiarity with the nature of the underlying lesion, it behooves us as surgeons to avail ourselves of every opportunity to make the closest observations of the tissues exposed at operation. Of 53 operations upon epileptic subjects, which represent my surgical experience, in only 6 is it recorded that the findings were negative, and of the remaining the following conditions were noted: Cysts (8), adhesions (6), pachymeningitis with adhesions, edema or cysts (13), edema alone (11), with cyst (1), thickened dura (2), organized blood-clot (1), cystic degeneration (2), cortical gliosis (2). I wish to call attention here to the multiplicity of the lesions with which we have to deal and to the fact that a more or less definite pathological lesion was revealed in so large a percentage of cases.

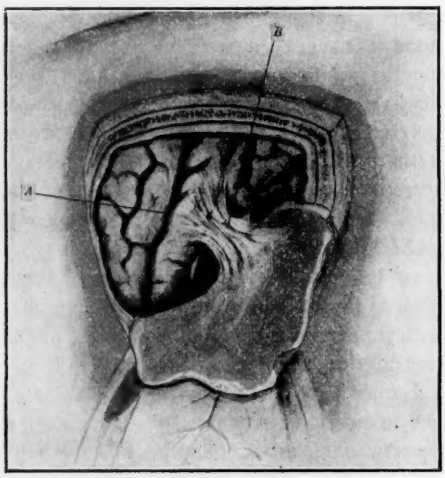

FIG. 1.—Reproduction of a sketch made at operation (File No. 3404), showing area of adhesions in postcentral convolution. This case illustrates a distinctly focal lesion with general convulsions. *A*, Rolandic fissure; *B*, focal lesion.

Furthermore, the multiplicity of the lesions at once suggests the intricacy of the problem with which we are dealing, and the character of the lesions foretells the difficulty of devising means for their relief by surgical intervention. I do not want to dwell too much upon the pathogenesis, and yet it seems to me so vital to an intelligent discussion of the subject that one can ill

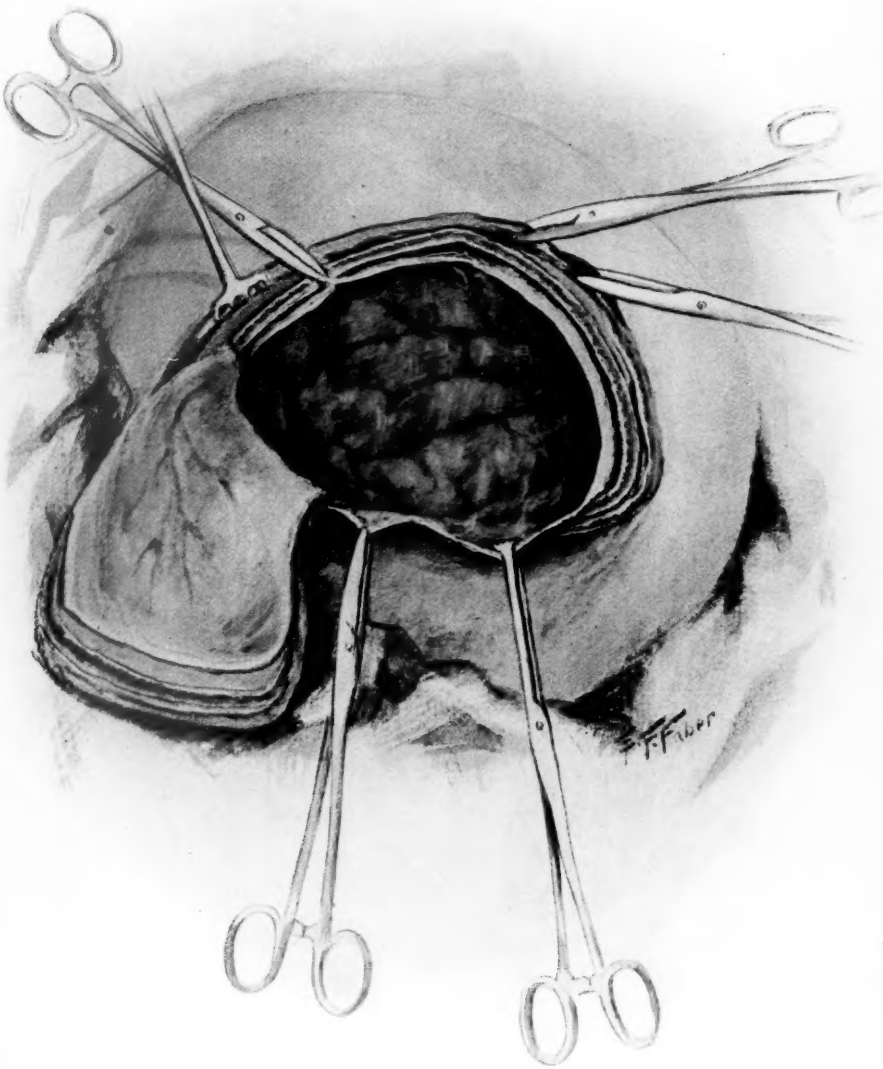

PLATE I.

Water color sketched at operation, showing an intense edema, giving to the surface the characteristic shiny, glistening appearance.

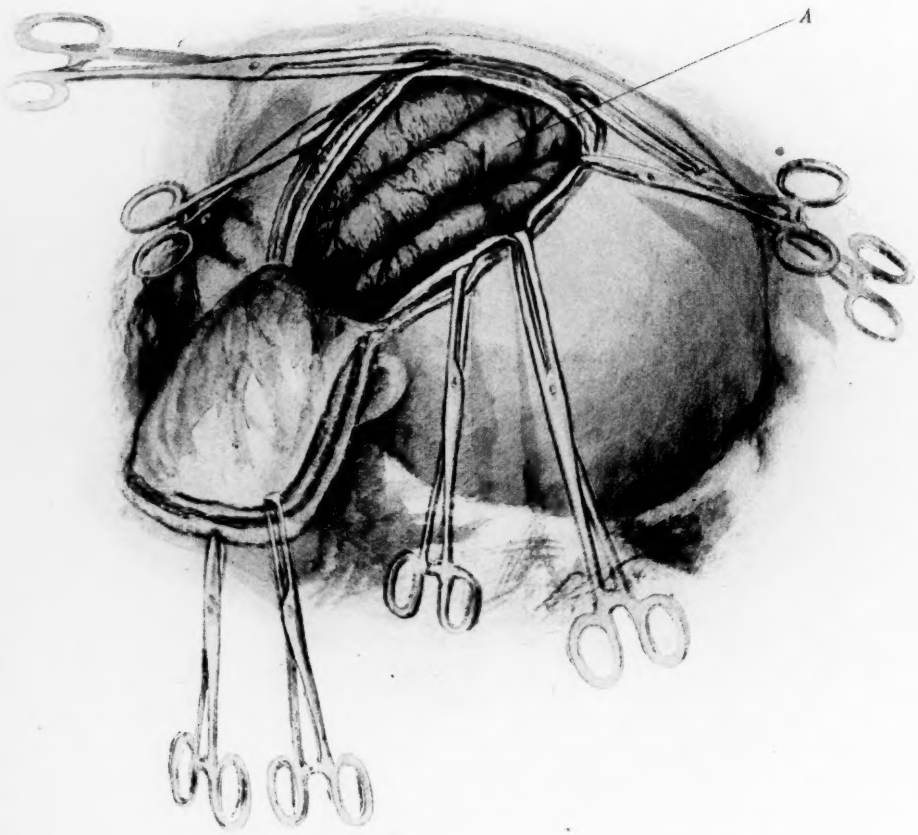

PLATE II.

From a water color reproducing the naked-eye appearances of a field exposed at an operation in a case of Jacksonian epilepsy. Note opaque patch directly over the arm center, location of which was determined by faradization.

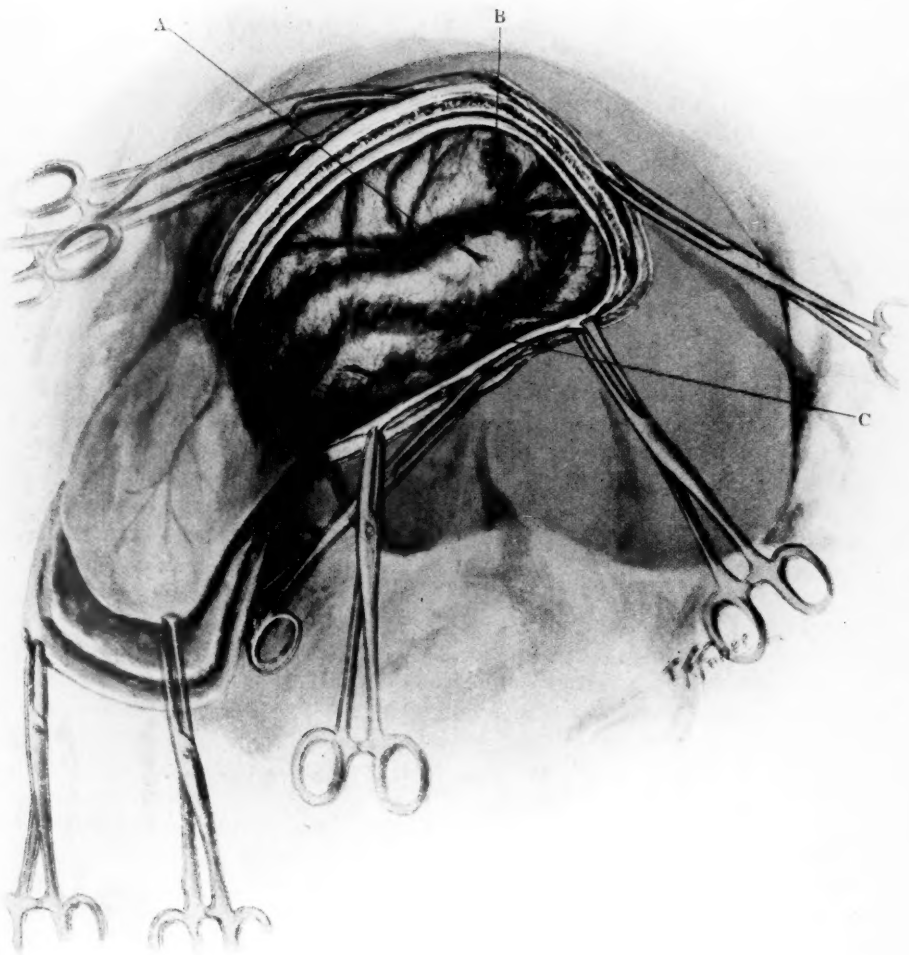

PLATE III.

Water color sketched at operation in a case of focal epilepsy, showing opaque lines along the line of the pial vessels and granular plaques, chiefly in the precentral convolution involving the arm center. (Position of latter determined by faradization.)

afford not to give it a very conspicuous place. Of the above enumerated lesions, a considerable number, almost half, were classified as pachymeningitis or edema. (See Plate I.) As to the latter, we find in the subarachnoid spaces an unusual amount of cerebrospinal fluid, sometimes clear and sometimes cloudy like barley water, due to the presence of particles of lymph; upon pricking the pia and arachnoid with the point of the knife an unusual quantity of fluid escapes and may continue to drain for some time after the operation. I acknowledge the possible source of error in determining with precision at the operation whether the amount of fluid in the subarachnoid spaces is beyond the limitations of the normal, since a certain amount of fluid is present in these spaces under normal conditions. But there is no doubt in my mind, and this observation has been confirmed by many others, that in a not inconsiderable number there is a large enough collection of fluid to warrant the condition being regarded as different from what we are accustomed to see in the cortex of the normal brain. In a recent article, Alexander (*Lancet*, Sept. 30, 1911) lays great emphasis upon edema as an important causative factor in the instability of the cortical cells to which epileptic seizures are ascribed. In 20 successive operations edema of the pia-arachnoid was recorded as present.

In addition to diffuse edema, I have indicated under the term pachymeningitis an opaque appearance of the membranes mostly confined to the course of the vessels in the sulci between the convolutions, but occasionally more diffuse, covering a portion of one or more convolutions. This opacity, I take it, is due to the deposition of lymph or to an exudate of traumatic or inflammatory origin, as in not a few instances there has been a history of trauma or of some infectious disease, particularly scarlet fever. Whatever the origin or the nature, this pathological picture is often seen, sometimes alone, sometimes with adhesions, and sometimes with edema. I have made no reference to the microscopic pathology, as there has been no opportunity to make a histological study of the cortex in our clinical experience. Such changes as may be the result of congenital defects or of degenerative and inflammatory processes have been found by those who have made systematic examinations of epileptic brains. (See Plate II.)

Selection of Cases.—Of importance greater than the performance of the operation is the selection of cases. Because of its otherwise hopeless nature and because of the occasional recoveries following operation, the surgeon's advice and opinion are frequently sought, and in my experience the majority of cases present no surgical indications. I have never seen a case of so-called "reflex" epilepsy, but there is sufficient evidence from competent observers to satisfy me that sensitive peripheral lesions may be the determining factor in certain cases, and the propriety of operation under such circumstances should pass unchallenged. Reflex epilepsy as compared with other forms is infrequent. Traumatic epilepsy, on the other hand, is not unusual. In my series of 53 cases, there was a history of cerebral trauma of more or less severity with or without fracture in 27 instances. In almost every instance the patient or the parents will have remembered some incident in which an injury to the head was sustained, but a careful investigation should be made to eliminate those in which the injury or its consequences were comparatively trivial. It should be remembered, however, in this connection that seemingly trivial injuries in young children may be attended with hemorrhage or fractures, the presence of the latter being revealed by the radiograph (Denks and Schwarz, from Weil, *Beiträge zur klinische Chirurgie*, Bd. lxx, 1911). If there is no external evidence of injury, such as a cicatrix, a depression, or a cranial defect, a careful inquiry should be made as to what transpired immediately after the accident in order to determine whether the clinical condition was serious enough to have been caused by a fracture, concussion, hemorrhage, or contusion (see Fig. 2); whether

there was a period of unconsciousness, of delirium, of convulsions, of persistent headache, or of transitory paralysis of one side or the other. We are justified in recommending operation in traumatic epilepsy without external evidence of injury when the seat of the lesion can be surmised either from the nature of the attacks or from the symptoms attending the original injury. The seat of the lesion is clearly indicated in some cases by the character of the aura, and in others by the Jacksonian nature of the seizures. We are justified, I believe, in recommending operation in traumatic epilepsy in all cases in which there is external evidence of an injury, such as a depression of the cranium, more particularly defects of the cranium, but occasionally only cicatrices, where the history indicated serious cerebral trauma. The results following the removal of traumatic cysts, of fragments of bone, of thickened areas of dura justify the radical policy to which surgeons generally subscribe in their attitude toward traumatic epilepsy.

FIG. 2.—A case of traumatic epilepsy with a large cicatrix and depression, the result of a compound fracture.

Much finer discrimination must be exercised, however, in selecting cases from the group commonly known as symptomatic or general. In this group the convulsions may be Jacksonian or general. It is in the former, however, in which I have made it a practice to recommend an exploratory operation. In this group may be included the cases which follow the so-called cerebral palsies of children, in which the lesion found at operation may be the result of an encephalitis or meningoencephalitis, such as porencephalus, cyst formation, gliosis, circumscribed granular plaques (see Plate III), or the pachymeningitis already alluded to. While in this group the character of the attack clearly indicates the area to be explored, the nature of the lesion is unfortunately not likely to be favorably influenced by any surgical procedure. That any operation could affect the gross extensive structural lesions that one sees in many of these cases is out of the question, so that as a class the epilepsies of cerebral palsies in my experience derive little, if any, benefit.

In the absence of residual paralyses or spasticities, one can determine the seat of the lesion in symptomatic epilepsy by a careful examination after the attacks, which may reveal some slight disturbance either motor or sensory in the extremities or in the distribution of the facial, trigeminal nerves (Krause), or nerves supplying the ocular muscles, or some disturbances of the reflexes. Thus by an examination after an attack or by the character of the aura (see Fig. 3) we may find a guide to the seat of the lesion even where the attacks are general and not Jacksonian, and under such circumstances I have been in the habit of advising exploration. In another group of cases, while the seizures are general at the time the patient comes under your observation, careful inquiry may reveal the fact

FIG. 3.—Photograph of patient at onset of general epileptic seizure, preceded by an aura of pain in the left leg, which the patient grasped firmly in the hope of averting an attack.

that at the onset the convulsions were distinctly focal.

Briefly, then, I include in the indications for operation cases of traumatic epilepsy with such restrictions as have been indicated, cases of Jacksonian epilepsy, and cases of general epilepsy in which there are symptoms indicating a focal lesion. But no matter what the type, the operation must be undertaken with the full realization that the pathological lesion may be of such a character as to defeat any attempt to arrest the disease. It is needless to say in this connection that there is nothing in the manifestation of the disease to indicate the nature or the extent of the lesion. Before the operation this is purely a matter of speculation; the most insignificant lesion may be associated with the gravest form of the disease, and *vice versa,* serious alterations in the structure of the cortex may give rise to attacks comparatively infrequent and relatively mild.

Operative Procedure.—The character of the operation must vary according to the character of the lesion, on the one hand, and perhaps the variety of epilepsy on the other. First of all as a matter of prophylaxis should we not be a little more painstaking in the examination of patients with cranial and intracranial injuries? If within a few days of the injury we can detect signs of hemorrhage, either epidural or subdural, the suspected region should be uncovered and the clot, if found, removed. I recall a case in which following a basal fracture and cerebral contusion I was able to detect slight weakness in the left upper extremity, and upon exploring the motor cortex I found and removed a small clot from over the arm center (see Fig. 4). If this had been allowed to remain, it could readily have become the exciting cause in disturbing the equilibrium of the cortex. In the line of prophylaxis also we should not only insist upon the elevation of fragments but upon the repair of defects following fractures of the cranium, if not immediately, at least as soon as the condition of the wound will allow. In justification of this I may quote from Gobiet (*Wiener klin. Woch.,* 1908, No. 21), who brings up the old question of the relation of cranial defects to epilepsy, and recalls Stieda's report of a series of thirty-three cases in which very favorable results were obtained by closing the defect.

In traumatic epilepsy with marked depression, the contour of the skull should be restored and at the same time the region beneath explored. Where we have large or small defects these should be repaired, preferably by the König-Müller method, transplanting a fragment composed of the outer table of the skull and pericranium to

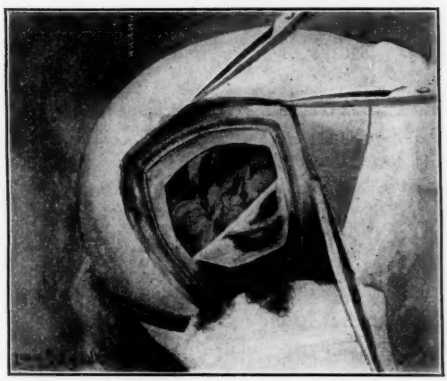

FIG. 4.—From a color photograph taken at operation, in which a thin pial clot was discovered in the region of the arm center.

the defect and securing the same in place with interrupted sutures (see Fig. 5). While I have in the past used celluloid plates, I have abandoned them altogether for the autoplastic method, and have now under observation four cases, none of which have as yet, however, passed the three-year limit. Adhesions are just as big a bugbear in the cranial as they are in the peritoneal cavity. When they form, as they frequently do, between the dura and the pia-arachnoid, either they should be left undisturbed or we should be prepared to sacrifice a portion of the dura involved, especially if it overlies that region of the cortex from which the convulsions are initiated. The mere division of adhesions will be followed inevitably by their reformation, and the interposition of foreign material is impracticable, as the latter acts as a foreign body and source of irritation.

There need be no discussion as to the management of cysts. The latter should be evacuated and as much as possible of the cyst wall removed, but if the cystic formation is merely a part of a porencephalic

FIG. 5.—Photograph of patient with traumatic epilepsy, with large cranial defect.

process or of cystic degeneration, the mere evacuation or removal of the cyst will have little if any influence upon the epileptic attacks (see Fig. 6). The same general principle applies to all focal lesions as applies to cysts. No matter what their nature, whether

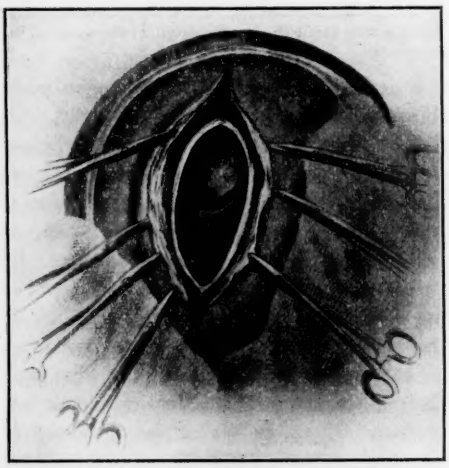

FIG. 6.—From a sketch, made at operation, showing extensive area of cystic degeneration of traumatic origin.

tumors, gumma, organized blood-clots, fragments of bone, thickened dura, or what not, they should be removed. Thus far the problem is comparatively free from difficulties; when, however, we are confronted with cases in which the process is more diffuse, as in the cases of edema or in those in which there is no demonstrable lesion, we must choose one of several methods: (1) a method designed to afford drainage, (2) excision of the cortical center, Horsley's method, and (3) the decompression method of Kocher, the so-called *"ventilbildung."* Having had no experience with Bircher's method, I will pass it by without comment; suffice it to say that Bircher recently recommended gentle massage of the cerebral cortex and believes his cases were favorably influenced by the operation.

In dealing with cases of edema alone, I have been in the habit of pricking the membranes at various places in order to allow the fluid to drain off and of providing some outlet to the epidural space either by having a portion of the dura unsutured, by removing a portion of the dura (see Fig. 7), or by a method about to be described, which commends itself especially to me, suggested by Krause. After the osteoplastic flap is reflected, an incision is made in the dura one-third to one-half an inch from the margin on three sides of the cranial opening. The dural flap is reflected, and at the four angles of the opening the dura is cut up to the margin of the bone. This enables one to reflect three dural flaps, so that when the osteoplastic flap is replaced a layer of dura is so interposed between the bony surfaces as to prevent their union. If we recognize in edema a pathogenic factor and believe the convulsions will be favorably influenced by drainage, I know of no better way in which drainage can be provided for than by the method as above outlined. In looking over my records, I find that in 23 of 53 operations I have concluded the operation by removing the bone from the temporal region as for a cerebral decompression. Many of these cases are too recent (7) to include in the final report, but of the older cases (16) there is one who in over three years has had but one mild attack, a virtual recovery.

When dealing with cases with focal symptoms, but without focal lesions, we

must adopt one of two methods, Kocher's decompression or Horsley's excision of the cortical center. As for the former, although not convinced of the rationale of the operation, I have practiced it a number of times especially within the last three years, because it has been recommended by so eminent an authority as Kocher, and received the indorsement and the favorable results reported by Friedrich, Kümmel, Krause, and Kocher himself. Kocher proposed decompression on the theory that epileptic seizures are provoked by a condition of intracranial hypertension. This idea has been confirmed by observations of Hause and Hitzig, and of Stadelman, while,

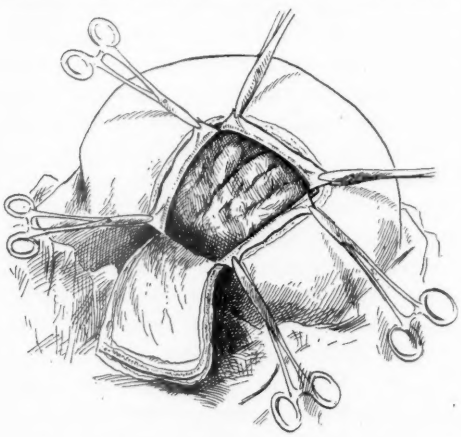

FIG. 7.—Schematic representation of method of providing drainage in cases of edema. Note narrow marginal dural flaps reflected over margins of bony opening.

on the other hand, Nawratzki and Arndt look upon increased tension as an effect rather than a cause.

With Horsley's operation, my experience has been limited to one case in which the facial center was excised without any appreciable benefit. This method in its day was enthusiastically received, later was practically abandoned, and more recently has been revived. The failure attending its practice has been attributed to the fact that surgeons determined the area to be excised only by anatomical guides rather than by the exact methods of faradization. My own objection to the operation was based on the theory that the resulting scar would in itself be sufficient to excite convulsions and that recurrence would be the rule rather than the exception. If further observations do not sustain this argument, I should be inclined to adopt it in those cases in which no other lesion is found and in which the center can be accurately determined by faradization.

Results.—Extraordinary reports have been issued from time to time as to the effects of surgical intervention, extraordinary chiefly in the great variability in the percentage of recoveries in the hands of different operators. It is difficult to account for this great variation, unless it be that in many instances the reports are issued too soon after the operation. To standardize the result, no case should be reported as cured unless at least three years have elapsed since the operation. Of course the three-year limit is purely arbitrary, although quite reasonable, as relapses or recurrence after that time are exceptional, but the well-known effect of operation *per se* upon epileptic subjects makes it imperative that a reasonably long time should have elapsed before any case should be put on record as influenced by the operation. The effect of operation *per se* upon epileptic subjects has never been satisfactorily explained, and yet no one who has had the opportunity of observing many cases in the postoperative period could fail to recognize the change of temperament, of general morale, as well as the freedom from attacks. Often have I had patients tell me in the convalescent period that they had not felt so well for five or ten years. We cannot attribute the transformation altogether to the relief from attacks, for in many cases the attacks may have been comparatively infrequent. Can it be due to any modification of the metabolic processes or to any influence upon glandular secretions, to change of environment, of habit, or of diet, to any factors which may influence the nutritive processes of the body in general and the brain in particular? We can only conjecture as to this, but the question has arisen in my mind as to whether the effect of operation *per se* may in some

cases be more than transitory in effect and account for a certain number of those cases which have been reported as cured irrespective of what particular technique may have been carried out. In view of the doubtful efficacy of some of the operative procedures which have been practiced, I cannot help but feel that there is some foundation for this hypothesis.

Turning now to my own records, out of 25 cases which have passed the three-year limit and could be traced, seven, or 28 per cent, have been profoundly influenced by the operation. Of these seven, one (File No. 982) was a case of Jacksonian epilepsy of five months' duration, in which a subcortical cyst was found at the operation and the cyst wall removed. He recovered considerable strength in the arm and leg, which were partially paralyzed, the headaches of which he complained were entirely relieved, and his attacks were reduced in frequency to one every two months and are much less severe than they were before.

In the second case (File No. 1102) the pathological lesions were a pachymeningitis, edema, and increased tension. The operation was performed six years ago; the attacks, of one year's duration, at first were of the Jacksonian type and afterward became general; there have been no attacks for the past three years; the patient, now a young man of nineteen years, is of sound physique, able to work, and his mind is much clearer than it had been.

The third patient (File No. 1249) was a young man of twenty; since the operation, in 1906, the attacks have become progressively less severe and less frequent; he has been entirely free from attacks for the past nine months. A diffuse pachymeningitis and cortical cyst were uncovered at the operation. The patient's disposition has improved, he is able to work, and in every other respect he is perfectly well.

The fourth patient (File No. 2482) within a year of the operation in 1907 had sustained a serious cerebral contusion without focal symptoms, but with loss of consciousness followed by delirium extending over a period of several weeks, and an organized blood-clot was found in the motor region and removed. At the site of the clot there were firm adhesions between the dura and pia. Four years have elapsed since the operation, and in this time there have been no attacks for the past 3½ years. This case emphasizes the importance of operating upon all cases of cranial trauma in which there is any reason to believe there has been a cortical hemorrhage. Had we been able to detect any focal symptoms at the time of the injury we would have urged operation without further delay, but despite frequent and careful examination no evidence of cortical hemorrhage was apparent.

In the fifth of the series (File No. 2683) nothing was found at the operation but an intense edema; although the patient had sustained a fracture of the skull there was no evidence of any injury to the internal table or to the underlying meninges and cortex. Before the operation he was having two or three attacks a week, all general in character, but he has had none since.

In the sixth case (File No. 3404) the patient was twenty-three years old at the time of the operation, three years and nine months ago. She had had concussion of the brain at eleven, her first convulsion at fifteen; the attacks were general in character. An area of adhesions two centimeters in diameter was found a little behind the post-central convolution. Although almost four years have elapsed, the patient has had but one attack, of which she had no intimation, as it was not severe and occurred at night.

In the seventh case (File No. 3626) the patient, a young man of twenty, had sustained a fracture of the skull at the age of six. The operation, performed almost four years ago, revealed an intense edema and a pachymeningitis, and since that time he has had no convulsive seizures. He has been in splendid health and able to attend his work regularly during the four years intervening.

Briefly, then, of 25 cases operated upon more than three years ago, seven have been profoundly influenced:

SUMMARY.

	Date of operation.	Character of attacks.	Duration of disease.	Findings.	Operation.	Result.
Case 1.....	1905	Jacksonian.	5 months.	Subcortical cyst.	Evacuation of cyst.	Attacks less frequent and less severe—once in two months.
Case 2.....	1905	General.	1 year.	Pachymeningitis and edema.	Craniotomy.	No attack in three years.
Case 3.....	1906	Jacksonian.	6 years.	Pachymeningitis and cyst.	Evacuation of cyst.	Gradual subsidence of attacks; none for past nine months.
Case 4.....	1907	General.	6 months.	Organized blood clot.	Clot removed.	Only one since operation; none for past 3½ years.
Case 5.....	1907	General.	?	Edema.	Craniotomy.	Has had no attacks since operation.
Case 6.....	1908	General.	8 years.	Adhesions and pachymeningitis.	Craniotomy and decompression.	Only one mild attack in four years.
Case 7.....	1908	General.	14 years.	Edema and pachymeningitis.	Craniotomy and decompression.	Has had no convulsions nor seizures since operation.

These results are by no means brilliant; but they are sufficiently gratifying to stimulate further investigations and renewed efforts. In his report to the German Surgical Congress in 1910, Tillmann presented a series of 29 recoveries beyond the three-year limit. In Krause's personal experience (*Allgemeine Wiener medizinische Zeitung*, 1910, iv) with 50 cases there were five completely cured or greatly improved. These figures correspond quite closely with my own as to the total number of cases and the number of cases benefited by operation. The value or the justification of the operation should not be measured by the percentage of absolute cures alone. To reduce the attacks in severity and in frequency from one in several days or weeks to one in several months or years, or even to be able to arrest the progress of the disease, is a matter of no small consequence and should not be lost sight of in the final analysis.

It has not been my purpose to advance the claims of surgery as a means of controlling a very distressing disease, but merely to present such observations as I have been able to make at the operating-table in the hope that they may throw some side-light upon a problem as peripatetic as it is perplexing.

SUMMARY.

1. The development of the surgical treatment of epilepsy has met with many impediments, among which should be mentioned: (*a*) The uncertainty as to the origin of the attacks; (*b*) the multiplicity of the pathological lesions; (*c*) the positive findings in some cases and negative findings in others.

2. In a larger percentage of cases than has been hitherto appreciated, some pathologic lesion of the exposed cortex has been found.

3. Operative intervention should be regarded as justifiable: (*a*) In traumatic epilepsy with external evidence of an injury; (*b*) in traumatic epilepsy without external evidence of an injury when the nature of the attacks or the symptoms immediately following the injury indicate the seat of the lesion; (*c*) in all forms of Jacksonian epilepsy of whatever origin; (*d*) in general epilepsy where the suggestion of a focal lesion may be found by a careful physical examination before or after the attacks in some disturbance of motion, sensation, or reflexes.

4. The operative procedure must be adapted to the character of the lesion: (*a*) Cranial defects should be repaired; (*b*) focal lesions, such as cysts, tumors, etc., should be removed; (*c*) edema, a very common lesion, calls for some method of drainage; (*d*) in Jacksonian cases without lesion the cortical center should be excised; (*e*) in idiopathic epilepsy without focal symptoms or lesions Kocher's decompression deserves consideration.

5. The value of the operation may be measured in terms of improvement or cure. Either should be considered as justifying the operation.

6. Gratifying results may be anticipated in at least 10 to 25 per cent of cases.

STATISTICAL SUMMARY.

1. *Number of Cases*.....63
2. *Number of Operations*.....53
3. *Character of Operations.*
   - Craniotomy 21
   - Decompression 3
   - Craniotomy and decompression.....20
   - König-Müller repair of defect..... 4
   - Evacuation of cyst.....3
   - Clot removed 1
   - Excision of facial center..... 1
4. *Sex.*
   - Males 41
   - Females 12
5. *Ages According to Decades.*
   - 0-10 7
   - 10-20 16
   - 20-30 18
   - 30-40 10
   - 40-50 2
6. *Etiology.*
   - Fracture 9
   - Cranial trauma 18
   - Intracranial hemorrhage (new-born)..... 4
   - Epidural hemorrhage 1
   - Cerebral hemorrhage 1
   - Tumor 1
   - Chronic meningitis 1
   - Infectious fevers 8
   - Undetermined 10
7. *Character of Attacks.*
   - General 31
   - Jacksonian 18
   - Jacksonian and general..... 4
8. *Duration of Disease.*
   - Less than 6 months.....10
   - 6 months to one year..... 3
   - 1 year to 2 years..... 8
   - 3 years..... 7
   - 4 " 2
   - 5 " 3
   - 6 " 4
   - 7 " 1
   - 8 " 4
   - 9 " 1
   - 10 " 1
   - 11 " 1
   - 15 " 1
   - 20 " 1
   - Duration unknown 4
9. *Findings at Operation.*
   - Cyst 8
   - Adhesions 6
   - Adhesions and pachymeningitis..... 2
   - Edema 11
   - Edema and pachymeningitis..... 8
   - Dura thickened 2
   - Organized blood-clot 1
   - Cyst and pachymeningitis..... 1
   - Cyst and edema 1
   - Cystic degeneration 2
   - Softening 2
   - Pachymeningitis 2
   - Negative findings 6

1724 SPRUCE STREET, PHILADELPHIA.

CHLORETONE AS A PREVENTIVE OF POSTANESTHETIC VOMITING.

BY LEONARD W. BICKLE, F.R.C.S. EDIN.,
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In the November, 1911, issue, page 836, F. J. Bowles of New York suggests the use of chloretone for the above purpose.

I would like to refer to my article and experiences with the drug published by you in October, 1902. I first began the use of it in 1900, and am to-day far more convinced than I was then that chloretone is the best drug to give before operating. I never operate under a general anesthetic if possible without the previous administration of this drug. The dosage is important. I have heard of failures, but inquiry has generally shown that an insufficient dose has been given. I invariably administer fifteen grains in a capsule one and a half hours before the time fixed for the operation. In one case in which a colleague tried it and it proved a failure, I found five grains were given over night and five in the morning. Another gave 7½ grains and had failures. An experience of my own is useful.

A very hysterical female patient was advised to have an examination under an anesthetic. Fifteen grains in three capsules of 5 grains each were ordered to be taken an hour and a half beforehand. She was intensely sick. It was found the chemist had misread the prescription, and only one capsule had been taken. An abdominal section was advised as the result of the examination. To avoid a similar mistake the fifteen grains were ordered in a single wafer. The appendix, with two foreign bodies in it, was removed, also the left ovary with a cyst the size of a mandarin orange; the right ovary was resected, and several small cysts were cut out. Not a vestige of sickness followed. There was so little shock that on the morning of the

third day I found her doing fancy needlework.

A young girl of nineteen, very small and delicate, had a rapidly growing soft fibroid of the uterus. This was removed by the abdominal method at 9 A.M. Chloretone was given. In the evening there was no evidence of shock; she conversed freely; she had not been sick in the least and had taken nourishment freely. The stitches were removed on the eighth to tenth days. On the fourteenth day she left the Private Hospital, and traveled to her home by rail (105 miles) on the sixteenth day. A few months later she came back to report, looking well, and had gained a stone in weight.

A strong man, alcoholic, had epithelioma of the lip. This was removed under chloroform, prior to my beginning the use of chloretone. He was excessively sick. Five years later he had glandular return. This time I gave him chloretone. He was not sick at all. A subsequent operation three years later was required; no sickness followed—chloretone was given.

I could multiply the foregoing by any number almost, but I think these examples are sufficient to show the value of the drug when given in adequate dosage to prevent sickness and minimize shock. For dental cases and adenoids and tonsillotomy cases I never give it, as a little vomiting is useful in getting rid of swallowed blood. Chloretone has many advantages:

1. It lessens the patient's dread of the table.

2. The anesthetic is taken more quietly.

3. Very much less anesthetic is required.

4. The patient is very quiet in coming to. There is no tossing and twisting about, and the quiet and absence of vomiting give physiological rest, and thus healing by first intention is facilitated, ligatures are less likely to slip, and bandages are not disturbed.

5. It minimizes shock in a remarkable way.

6. Nourishment can be freely taken as soon as the patient becomes fully conscious.

7. In operating in private houses less nursing assistance is required, and the nurse can straighten up, rough wash and wipe instruments whilst the patient is calmly resting. She does not have to sit by with bowl and porringer to prevent soiling of bedclothes by sickness.

Sometimes the drug causes a little dizziness before the operation. This is the only drawback I have ever found. I have never seen any trouble to the anesthetist. After ether particularly, some mucus may be thrown up, but there is no subsequent vomiting.

ANTITYPHOID INOCULATIONS.

The *Medical Record* of October 14, 1911, calls attention to the fact that the officers and men of the entire army of the United States, 76,000 in all, are being inoculated against typhoid fever—that is, all under forty-five years of age. The Secretary of War has submitted himself to vaccination, setting the example. Heretofore it has been optional for an army officer or private whether he would thus be protected; and on that basis 17,000 were inoculated. But now all must submit, by order of Major-General Leonard Wood. Major Russell of the Army Medical School in Washington has prepared the "typhoid prophylactic," which is being distributed to the various forts, posts, and other military communities throughout the United States and its possessions. In something like a few weeks the whole army is expected to be inoculated, and will certainly, within a fortnight thereafter, be immune to typhoid fever. Very little if any inconvenience has been felt; the vaccination is done precisely as against smallpox, in the left forearm, for all the soldiers. In civil life the left-handed man would be inoculated in the right forearm. The experience has been that the soldier loses not a single day's duty, and does not go to bed. He is watched carefully for twenty days and is then declared a typhoid immune. Of course, those who have unmistakably had the disease are not vaccinated. Whatever discomfort there is never lasts beyond forty-eight hours, and it

is in general less than that occasioned by vaccinations against smallpox.

Our army is by these measures being rid of typhoid fever, up to recent times a far greater destroyer of soldiers than the enemy's sword and missiles. For example, during the Spanish war two divisions of the Seventh Army Corps encamped at the time in Florida were submitted to an experiment; the one numbered 10,759 men, the other 12,801. The camp conditions as to sanitation were exactly alike for these two divisions, and the water for both was obtained from artesian wells. None of the officers or men in the smaller division had been inoculated with the typhoid vaccine; it had 2693 cases and 248 deaths from this disease. In the larger division a majority were inoculated, and it had but a single case of typhoid fever and no death. Except as just stated, little was done in our Spanish war, so that our troops then developed 20,738 typhoid cases, while above four-fifths of our mortality among officers and men was by reason of this disease. During the Boer war the British had 31,000 cases of typhoid fever. The typhoid fever rate in the German army was cut down one-half by vaccinating a portion of the troops in Southwestern Africa in the campaigns against the Hereros in 1904 and 1907. In India in 1908, among 12,000 English troops, one-half were vaccinated; the remaining 6000, under like conditions, remained unvaccinated; seven times as many among the latter contracted typhoid, and eleven times as many died of it.

Lieutenant-Colonel J. R. Kean of the Army Medical Corps observed, anent the recent application of this typhoid prophylaxis to our 16,000 troops in Texas, that although this force had been for more than three months exposed to heat, dust, mud, flies, and all the other vicissitudes of camp life, only one case of typhoid fever developed up to June last. "The medical authorities of the army," he said, "are much elated at this great feat of preventive medicine, which they hope will bring into common use a procedure of as great sanitary importance to the American people as was the discovery of the method of preventing yellow fever."

Since such immunity against typhoid is obtainable in military camps it ought to be, as Colonel Kean suggests in the sentence above quoted, quite as capable of achievement in civil life—especially in large communities. Every urban typhoid epidemic has been succeeded by a secondary epidemic, evolved naturally from it. The secondary phenomena might easily be prevented by prompt inoculation of all those living in and about the affected region. The private practitioner should have at his disposal antityphoid vaccine, quite as he now has this prophylactic means against smallpox; and he should have his patients submit to the use of the former quite as is done now, as a matter of course. in regard to smallpox. If the inoculations are made in the late afternoon it is very likely that any untoward manifestations will have disappeared by the following noon. These inoculations should especially be submitted to by traveling business men who may in the most subtle and inscrutable ways be subjected to this ingestion infection. Typhoid fever is peculiarly a disease of youth and early manhood and womanhood; and it might not be inadvisable for those young men and women who go to college and boarding-school to submit to this preventive measure before leaving home. Tourists, vacationists, may not only themselves contract the disease, but, even of more importance from the communal viewpoint, they may become typhoid carriers, introducing the bacillus into regions hitherto exempt. All such should be inoculated. Physicians themselves, nurses, orderlies, and hospital helpers should all submit as a matter of course. It is considered that the protection is effective for two years, and that the one inoculation will afford much, though not complete, protection for many years more, perhaps through the remainder of the individual's life.

EDITORIAL.

ANESTHESIA BY VARIOUS METHODS.

There are few subjects which are of more universal interest in medicine than anesthesia produced for the relief of pain arising through surgical methods of cure, and the GAZETTE endeavors to keep its readers posted in regard to all the points of value which appear from time to time in the medical literature of the world concerning this important topic. One of the most recent summaries of our present knowledge appears in the London *Lancet* of December 30 in the course of a description of the general progress of medical science during 1911.

So-called intratracheal ether insufflation, originally devised by Meltzer and Auer, in order that radical operations upon the thorax might be performed without interference with the vital function of respiration, receives indorsement, and the various modifications of this plan suggested by other investigators, as to the technique, are also referred to. It will be remembered that by this means anesthesia can be maintained with impunity for hours provided that the strength of the ether vapor is adjusted to the requirements of the patient, and provided that sufficient, but not excessive, air-pressure is maintained. Chloroform vapor does not lend itself to this method because of its dangerous properties, and even this method of administering ether may still be considered as largely in the experimental stage. The method consists, it will be remembered, in the introduction into the trachea, at a point near its bifurcation, of a flexible tube, the caliber of which is smaller than the lumen of the trachea, and the driving of a continuous stream of air through this tube, the air returning between it and the tracheal wall. By this means efficient pulmonary air circulation is maintained, the ether vapor passing in through the tube with the air. The charging of the air with ether is carried out by its passage through a vessel containing liquid ether. As a rule it is wise to see that the air and ether vapor is at a temperature of about 10 degrees above that of the room, and that the air is moistened and filtered before it enters the rubber tube.

Another method suggested by Mr. Davies consists in the introduction of the tube and in the complete plugging of the larynx so that all the respiration takes place through an intake and outflow catheter. Ehrenfried uses scopolamine and morphine hypodermically before this method is attempted, and if a thoracic operation is in progress a pressure of 20 millimeters of mercury will maintain a moderate distention of the lungs even after the chest wall has been opened.

Other investigators have attempted to produce anesthesia by intravascular injections, using hedonal dissolved in physiological salt solution. In other instances, one per cent of hedonal and five per cent of urethane, in 200 Cc. of saline solution, were employed. Jeremisch employed this method in 65 cases, one patient remaining under anesthesia for two hours and fifty-two minutes. He states that relaxation takes place in from five to eight minutes, and that the return of consciousness is rapid or slow, according to the size of the dose given. This method also is to be considered as distinctly in the experimental stage. It seems to us to have little to commend it and much to condemn it.

In regard to the intravenous injection of ether for the production of anesthesia, it is noteworthy that in 23 cases Küttner met one with pulmonary embolism and one with a clotting at the seat of injection, so that he has put the method to one side as perilous. Others consider that it is justifiable only in peculiar cases, and had best be preceded by scopolamine and morphine. Autopsies made on 11 patients, the deaths being due to disease and not to the method, failed to show any damage except occasional thrombosis in the vein. Five per cent of ether is used in salt solution, the salt solution being kept warm by a warming

chamber. Some operators use intermittent transfusion; others continuous transfusion. Kümmel has tried this procedure in 90 cases, the patients being feeble and unfit for other methods. He states that there was no nausea or vomiting, and, furthermore, that accidents are less apt to occur with continuous transfusion than with the intermittent type. Burkhardt has met with no accidents in 250 cases treated in this manner. Kümmel employs two supply vessels joined to one tube by means of a Y-shaped piece of tubing. One vessel contains five per cent ether and normal saline, and the other only normal saline, so that they can be used alternately, if it is so desired. Once anesthesia is noticed, which usually occurs in from five to ten minutes, he runs in pure saline, supplying ether only when it is needed, and states that the amount infused varies with the length of the operation. In one operation, which lasted nearly two and a half hours, the patient received 1700 Cc. of the five-per-cent ether solution. This very large bulk of fluid introduced into a vein (it amounts to nearly two quarts) strikes us as possessing distinct elements of danger both as to the lungs and the kidneys if not the heart. Koenig, who had two deaths which he thinks were hastened by this method, urges the view that the bactericidal properties of the blood are lessened by its dilution and suggests the possibility of air embolism. It seems to be pretty well decided that this method is certainly contraindicated in patients suffering from advanced degenerations of the cardiovascular system.

During the past year rectal ether narcosis has been revivified, and we trust will be once more consigned to the limbo of useless and dangerous measures.

The employment of nitrous oxide gas in major operations is increasing in popularity in this country, largely through the advocacy of Crile and others, and numerous records have been made of major operations performed when the patient has been under its influence. One thing seems to be universally acknowledged, namely, that for the successful use of nitrous oxide during major operations it must be administered by one who has become exceedingly skilful in its employment.

We have from time to time referred to the use of scopolamine and morphine, not only as a preliminary to the use of ordinary anesthesia, but also concerning its employment in parturition, and we note with interest that the London *Lancet* quotes the editorials which we have published on this matter in the THERAPEUTIC GAZETTE. There can be no doubt, we think, of the advantage of morphine and atropine, or morphine and scopolamine, before ether and chloroform, particularly before ether, because much less ether is necessary. The scopolamine-morphine method in the parturient woman seems to be particularly advantageous in hysterical patients or those who are neurotic, and attention is called to the fact that its only disadvantage is that it is prone to produce asphyxia in the child, which Corbett thinks is due to the morphine, and asserts is best treated by immersing the infant in a hot bath. Corbett also suggests that strychnine be added to the scopolamine and morphine, since it does not lessen the analgesia and prevents the depression of the respiratory center of the mother.

Again, quoting the THERAPEUTIC GAZETTE concerning the subject of spinal anesthesia, the *Lancet* approves of our expression of opinion that this method is to be resorted to only in very isolated and peculiar cases, and McCardie states, as a result of his statistical inquiries amongst British and American surgeons, that the mortality of this method is about one in 826, although Hochmeyer and Koenig record a higher rate of fatality, namely, one in 200. Both of these rates are far in excess of the mortality rate of chloroform and seem to prove clearly that spinal analgesia is by no means a safe procedure. Furthermore, the after-effects are often more annoying and serious.

Concerning postanesthetic complications we are glad to note that attention is once more called to the observations of Pasteur of London, to which we have already called attention in an earlier issue of the GAZETTE, to the effect that most of the so-called cases

of pneumonia following ether and chloroform are not instances of pneumonia but of atelectasis of the lung, and that this complication is particularly prone to occur in operations in the upper abdominal segment. We agree with Pasteur that too frequently the physician and surgeon are satisfied with the diagnosis of pneumonia under these circumstances when atelectasis is the real condition.

A considerable amount of work has also been done concerning the development of glycosuria following etherization. The reducing agent in the urine is dextrose, and there is a definite hyperglycemia, the excess of sugar coming from the liver.

Another interesting paper which is worthy of consideration is one which was published by Bovée, who seems to prove that the Trendelenburg position materially increases and influences the secretion of urine, and who therefore urges that in patients who are sufferers from renal insufficiency or arterial or cardiac lesions this position be, if possible, avoided. So, too, Chandler has pointed out that vomiting after ether is less marked in those patients who have their heads slightly elevated during its administration than in those who are absolutely prone. This, he states, is particularly true of patients who already have cardiac disease.

We have already called attention in these pages to the investigations of Graham as to the influence of ether upon bacteriolysis, agglutination, and phagocytosis. The first two functions seem to be unaffected by ether, but phagocytosis seems to be diminished chiefly by the action of the drug upon the phagocytes and not upon the blood serum.

THE DEVELOPMENT OF GLYCOSURIA AS THE RESULT OF NERVOUS SHOCK.

From time to time clinicians meet with cases of glycosuria or diabetes which seem to be due to a nervous shock, as, for example, that which results from a railroad accident. More commonly they meet with instances in which the glycosuria apparently develops as a result of more or less prolonged nervous stress, as in women who suffer great bereavement after long weeks of nursing, or in business men who are severely strained by financial disaster. In some instances, too, it develops as the result of severe illness. In all of these cases the glycosuria may be but temporary or become permanent, and finally develop into a true diabetes. While the symptoms in each instance may be the same, it is probable that a certain percentage of these cases have a better prognosis than those which develop glycosuria, or diabetes, as the result of some actual injury, grave disorder of metabolism, or disease of the pancreas, in that rest, and measures commonly associated with it as sedatives and tonics, may result in a readjustment and establishment of normal function.

An interesting research, indicating that glycosuria may arise as the result of nervous stress and strain, has been contributed to the *American Journal of Physiology* of December 1, 1911, by Cannon, Shohl, and Wright, who have found that when cats are excited for even so short a time as one-half hour by being uncomfortably bound, or by being caged in the presence of a barking dog, they develop glycosuria; whereas pain, cooling, or other supposedly harmful factors fail to produce this result, fright or rage being the essential element. It is also interesting to note that there seems to be a relationship between the functions of the adrenal bodies and the development of the glycosuria under these circumstances, because if the adrenals are carefully removed the glycosuria does not appear even if the source of irritation is maintained three times as long as in other cases, although the manifestations of excitement on the part of the animal may be in each instance identical.

As a matter of collateral interest, although not directly connected with the development of glycosuria as the result of nervous irritation, we may also call attention to a study made by Cannon and Hoskins, recorded in the same journal, in which they point out that there is a great similarity between surgical shock and the

condition of an animal after removal of the adrenal bodies. They suggest that the injury which is responsible for the shock results in so great a discharge of their secretion on the part of the adrenal glands that they are unable, for a time at least, to continue their average function, with the result that blood-pressure falls and other symptoms develop. In any event they seem to have proved that great sensory stimulation causes increased adrenal secretion. The relationship between adrenal function and glycosuria is too complex a problem for us to deal with here, but the two sets of experiments which we have just quoted suggest an interesting line of thought as to the influence of nervous irritation upon adrenal secretion in its relation to glycosuria and surgical shock and as to treatment as well.

THE FUNCTION OF THE PERIPHERAL VESSELS IN COMPENSATING BLOOD LOSS IN HEMORRHAGE.

One of the most interesting lines of investigation which is open to the laboratory worker is the study of the various methods designed by Nature to save life when it is jeopardized by accident. In many instances organs are not only duplicated, but each organ has such a large factor of safety that it is quite capable of performing not only its own work but much, or all, of the work of its mate. So, too, some organs which ordinarily have little functional activity along certain lines are able, when the demand is made, to take the duty of those which have been destroyed.

We are all familiar with the several provisions which are made by Nature for the control of hemorrhage. By the puckering, or inversion, of a severed artery the opening is diminished in size, and thereby the second measure of protection, namely, the closing of the opening by a clot, is accelerated.

Although the fact that a clot rapidly forms in healthy blood when this fluid escapes from a vessel has been known for hundreds of years, and although an immense amount of study has been devoted to the changes which take place in the blood by reason of which clotting takes place, we have as yet not reached definite and final conclusions concerning all the factors involved. It is quite true that thirty years ago and more it was recognized that the blood contained a substance known as fibrinogen, and was supposed to contain a second substance known as fibrinoplastin, both of which were necessarily present if clotting was to occur. The view has also been advanced that the clot was produced as the result of the presence in the blood of a ferment, but recent physiological investigations would seem to prove that this is not the case.

Within the last few months a very valuable contribution has been made to this important matter by no less an investigator than W. H. Howell, who, in *The American Journal of Physiology* of December 1, 1911, also THERAPEUTIC GAZETTE, February, 1912, not only describes the experiments which he has made but also considers the researches which have been made during the last few years by other workers in this important field, notably by Morawitz. It has been proved that the blood not only contains fibrinogen but a substance now known as "prothrombin," which apparently has its origin in the blood platelets. This substance does not seem to be found in the tissues of animals below the mammal, in whom the prothrombin seems to have its origin solely in the blood platelet. To this tissue extract the name "thromboplastin" has been given. The presence of these agents alone is not sufficient to result in coagulation. Calcium must also be present in normal quantity. In other words, as Howell points out, there are three necessary fibrin factors—fibrinogen, prothrombin, and calcium—and when hemorrhage occurs and the blood escapes from a vessel there is added thromboplastin from the tissues, which aid still further in the coagulation.

It is interesting to note in this connection that Howell attributes the failure to clot on the part of the blood when in the vessels to the presence of a fourth substance called "antithrombin," which is at once neutralized by the thromboplastin which is formed from

the blood platelets and the tissues as soon as the blood leaves the vessel.

In the same issue of the same journal Cope reports the results of his studies concerning the importance of the contraction of the peripheral arterioles during the occurrence of hemorrhage. Although it is a well-known fact that free bleeding lowers blood-pressure it is also a fact that the system immediately attempts to overcome this lowering of pressure, resulting from loss of blood, by diminishing the size of the peripheral arterioles, thereby diminishing the vascular capacity and preventing a too free flow of the remaining blood in the capillary networks. Cope proves quite conclusively that this compensatory rise of pressure is chiefly or solely due to this vascular contraction, since a free hemorrhage results in diminished viscosity of the blood and venous pressure is decreased. In other words, this is another illustration of the ability of the body by increased functional activity to compensate for a loss which otherwise might produce death.

THE TREATMENT OF GONORRHEA IN WOMEN.

Although it is true that gonorrhea in women, in so far as its urethrovulvovaginal course is concerned, even in its acute stage, is often so mild as to excite no particular attention, yielding readily to any cleansing treatment, its ultimate cure is generally recognized as in some cases practically impossible of accomplishment. Cary (*American Journal of Surgery*, December, 1911) characterizes it as an infection with great variability of virulence, the acute course of which is seldom shortened and often aggravated by curative applications. With this pessimistic dictum concerning therapeutics many of the profession will not agree. That the ducts of regional glands may harbor organisms indefinitely is however universally conceded. The further statement that involvement of the uterus and adnexa is frequently the result of meddlesome treatment of the vulvovaginal infection, and is best treated by rest and time as curative measures, will be generally accepted as correct. The author states that if gonococcic infection be limited to the tube it dies in its own toxins and the processes become sterile in from four to six weeks, whilst if the peritoneum is involved the process is usually successfully limited by a protective exudate which in the majority of cases resolves without abscess formation and is frequently followed by restoration of tube and ovary function.

It is particularly with the treatment of gonorrhea in women that Cary concerns himself, and he frankly states that as a rule it is badly carried out and in the direction of excessive activity. In the acute stages, usually not seen, rest is regarded as of major import, whilst douches are avoided, excepting in the form of washing repeated twice a day for the purpose of cleanliness. Vaccination is regarded as futile. In the chronic cases it is well recognized that infection is most persistent in the cervix, in Skene's glands, and in the ducts of the vulvovaginal glands. The Skene's glands are best cured by cauterization, either with carbolic or a fine cautery point; the cervix, according to Cary, by a 10-per-cent solution of silver nitrate, vaccines not having proven particularly serviceable. In accord with the general feeling upon the topic, operation is not considered advisable during an acute attack of salpingitis. A general peritonitis due to the rupture of a pus tube may call for a laparotomy and drainage; or the formation of abscess within the exudate may require drainage through the cul-de-sac.

A very conservative view is expressed in regard to operation, it being held that resolution will be accomplished in the majority of cases of salpingitis and pelvic peritonitis by time, douches, and tampons.

Persistent and disabling symptoms in a wage-earning woman, in whom the early and permanent cure is more desirable than fertility, may call for double salpingectomy, hysterectomy, and possibly appendicectomy. This method of procedure will cure 90 per cent of cases. It is held that operation may be safely performed after resolution of the exudate and at least four weeks' subsidence

of febrile reaction. In chronic cases decreased virulence of the organism and acquired immunity from long-standing infection make safe the closure of the abdominal wound after laparotomy. Particular attention is called to the fact that the most astonishing restoration of normal conditions within the pelvis may follow the gravest gonorrheal lesions.

Hussey notes in regard to the gonococcus in the puerperium that this infective agent may lie dormant for an indefinite period of time in the cervix, and that it may under favorable circumstances acquire new virulence and light up fresh inflammations. Clinically gonococcus infections differ from the septic ones in the mildness of the systemic symptoms, the tendency to appear during labor, or in the second or third week of the puerperium, and in the chronic course which they run. Pus-tube formation is more frequent and pelvic cellulitis less so, and the patient rarely presents the appearance of profound illness characteristic of other forms of sepsis. Moreover, the prognosis is usually good.

Although it is true in regard to both the male and the female that a gonococcic infection once implanted may last for months or years, and in either may produce permanent crippling, the great majority of these cases recover completely and fairly promptly. Those attended by most complications and most persistent in their course are usually the ones which have been treated vigorously and by the application of strongly irritating antiseptic solutions. All infections recover by a process of inflammation and acquired immunity. The curative inflammation is excited by the infection itself. It may be hyperacute for the result desired, in which case sedatives are required. It may be indolent, in which case stimulants are required. The best results are obtained by a wise choice of medicaments which need not be in themselves antiseptic. The acquired immunity is doubtless dependent upon the condition of general health. Therefore treatment having for its end the best maintenance of this condition will also most promptly accomplish a cure.

TUBERCULAR EPIDIDYMITIS.

This affection usually develops in young men painlessly, and is first discovered by feeling a nodule in the scrotum; it is often unattended by other demonstrable focus, ultimately softens and discharges with little or no pain, and becomes bilateral. It may or may not be accompanied by a tuberculous seminal vesiculitis, prostatitis, cystitis, or nephritis. Its clinical recognition is easy, and the therapeutic indications are fairly plain though not universally recognized. In the past it has too often been the custom, and it is so even at this day, to practice a castration in cases seen in the early stages of unilateral involvement. This in the majority of cases is followed by involvement of the other side, for which, if unilateral castration has been performed, the second operation has often been practiced. Though a cure probably results as far as the tuberculous infection is concerned, the patient may be left in a deplorable psychic state.

In a most instructive study of this subject based on 153 cases, Barney (*Boston Medical and Surgical Journal,* Dec. 14, 1911) notes that with one exception no case showed definite evidence that the tuberculous involvement of the epididymis followed a gonorrheal inflammation. Moreover, most of the patients had never had venereal disease, nor was trauma a factor of etiological importance. Eighty per cent of the cases had lost weight, often to an extreme degree; some had gained. Sixty per cent had pain, usually trifling. The patients were as a rule subject to characteristic exacerbation in which pain was intense, abating with rupture of an abscess and the establishment of a fistula, or by absorption of inflammatory products. Adherent scrotum, with or without fistula, was noted in 67 per cent of the epididymes, while sinuses were observed in 53 per cent. Fever was conspicuous by its absence. In only ten cases was the temperature over 100° F. before operation, the epididymes in these being in the stage of acute exacerbation. In 64 per cent of the cases in which this point was noted there was no demon-

strable evidence of the presence of tuberculosis elsewhere than in the prostate or epididymis. Active tuberculosis was noted in 29 per cent of the cases, usually in the lungs. Renal tuberculosis developed in but three cases. In two-thirds of the cases the prostate gland was clearly tubercular; in almost the same percentage the seminal vesicles were in the same condition. From 114 patients there were extracted 92 testicles, four castrations being double. The author states that the testicle itself appears to have been involved in 60 per cent of these. Pathological and clinical experience does not seem to bear out this statement, since in 71 cases in which a pathological report was given, 21 were definitely free from tuberculosis; 50 were described as tubercular, but as the records make no distinction between epididymis and testicle, it is impossible to draw any conclusion from them.

Barney holds that a very small percentage of testicles are affected by the tubercle bacillus to such an extent that orchidectomy is indicated. It is a fact with which most will agree that even when the testicle is infected to a considerable degree the fire burns itself out when the fuel furnished by the epididymis is removed. Allusion is made to 50 epididymectomies, single and double, with and without vasectomy. Of this number not one has returned for subsequent orchidectomy, and in an investigation of the end results of these cases no relapse in the testicle itself has been found. Of 33 untreated affections of the epididymis the second side became involved in 18 (55 per cent) within one year of the time of invasion of the first side. Among the operated cases 10 out of 19 (52 per cent) returned for operation on the second epididymis within one year after removal of the first. Since the patient is usually already sterile there can be no objection to epididymectomy with vasectomy. This operation rather than the one of orchidectomy is so abundantly proven by universal experience that total excision should be reserved only for the very exceptional case.

REPORTS ON THERAPEUTIC PROGRESS.

BURNS AND SCALDS.

ORMSBY in the London *Practitioner* for October, 1911, writes on this topic. He reminds us that there are innumerable methods of dressing burns and scalds, but it is best perhaps to describe a few of the most modern and, on the whole, most successful plans. First, however, one must insist on the great and insuperable disadvantages of all oily dressings—*i.e.*, carron oil and its antiseptic modifications—in that sepsis is extremely liable to follow their use. This point is worthy of consideration, because the lay mind has only two fixed ideas relative to burns: "No water; much oil"—consequently, as we are setting out on treatment directly in defiance of ingrained notions, we must prepare to defend our position in no doubtful way.

Before any dressing is applied we must attempt, as far as possible, to render the parts surgically clean. This is the more easily accomplished if we consider that the amount of shock present does not contraindicate the administration of light anesthesia. When the patient is thus guarded from increased shock we cut away all injured tags of tissue, snipping and removing all bullæ, and also, by douching with warm saline or mild antiseptic solution, attempts are made to gain asepsis. If the patient is very dirty the part may be cleansed by rubbing with a paste composed of commercial chloride of lime to which a crystal of sodium bicarbonate has been added, and then, when a comparative degree of cleanliness has been obtained, every trace of lime is removed by copious saline douches. When this cleansing process is impossible, while the patient is in the bath everything possible to secure cleanliness, without at the same time greatly increasing shock, is

done. The patient is now ready for the dressings. Long strips of lint of varying sizes soaked in a solution containing picric acid 1½ drachms, absolute alcohol 3 ounces, and distilled water 40 ounces, are lightly applied all over the injured area; next to this lint sheets of wool are placed, and the two layers are retained in position by means of a broad bandage. It is of importance that any bandage should be so arranged that a minimum of movement will be required for its removal. Provided one has reason to believe in the asepsis and antisepsis thus obtained, this is quite sufficient dressing for two, or even three, days, with occasional changes, provided hematuria, gastrointestinal disturbance, fast pulse, and high temperature do not lead one to diagnose picric acid poisoning. At the end of ten days, or sooner if there is any cause, the picric acid dressing is changed for one consisting of equal parts of boric lotion and hydrogen peroxide. This latter dressing, with daily changes, is usually all that is required up to the time of complete recovery. If at any time suppuration manifests itself, the part must be thoroughly and frequently cleansed by douching with warm boric or other mild antiseptic lotion, and either of the above dressings replaced. When only a small area has been injured and the picric acid treatment has been successful in preventing sepsis, one may substitute after a week zinc oxide ointment spread on thin protective tissue. This is pleasant for the patient and it seems often to increase the rapidity of the healing process, but one must watch with great care at each daily dressing for any sign of the inroad of pyogenic organisms and promptly meet their presence by free douching and return to the antiseptic measures recommended at first. During all this period it is hardly necessary to say that the patient's general health is carefully watched, and any indications for systemic treatment immediately acted upon.

Of other methods of dressing aluminum acetate has recently been strongly recommended as an application, and it would appear to be of considerable use, at least for injuries of small extent. It has the distinct advantage of comparative cheapness and of leaving no stain; it is applied as a watery solution of one-per-cent strength. Gauze is soaked in this lotion and applied to the injured surfaces. This gauze is then merely moistened with the solution and need not—indeed, had better not—be changed for several days. The small burns so often met with on the hands or feet are admirably treated by this means, especially as pain is greatly relieved, and in such injuries pain is the preëminent symptom.

Another comparatively new method of treating burnt surfaces in which a fair degree of asepsis has been obtained by the proceedings above mentioned is to spread over the raw area strips of sterilized omentum of the ox. This material, known as cargile, immediately on being smoothly laid on the part applies itself closely to the surface. Lint soaked in weak boric acid solution is then placed over the cargile, and the lint only is then changed about once daily in accordance with the amount of discharge which passes through the porous membrane. The cargile does not need changing, as owing to its porosity it does not retain the secretions of the raw surface. The advantages claimed by its supporters for this method is that the dressing—*i.e.*, that part which is in contact with the wound—has not to be changed; that it relieves pain quickly and to a marked degree; and that it prevents to a large extent the introduction of microörganisms without keeping back the discharge which is always present and which offers so good pabulum for bacteria.

Of these various dressings, picric acid has now stood the test of time, and although it cannot be considered ideal, if one intends to adopt a routine treatment for these injuries it is one on which reliance can be placed. It has, however, the obvious disadvantage for some patients of staining everything with which it comes in contact, and consequently when dealing with a case in which this is a matter of prime importance some of the other methods must be adopted.

LETHAL CARDIAC ANAPHYLAXIS IN THE RABBIT.

In an article in the *Journal of Experimental Medicine* of November 1, 1911, AUER renders these conclusions:

Acute lethal anaphylaxis in the intact rabbit is caused by failure of the heart.

This failure of the heart is due to a change in the heart itself; it is peripheral and independent of the central nervous system for its production.

This change in the heart is shown anatomically and functionally by decreased translucency, change in consistency, and by failure to respond to stimuli, and is probably to be classed as a chemical rigor.

The rigor of the heart is most pronounced in the right ventricle, the wall of which may be gray, stiff, very tough to the finger-nail, and non-irritable.

Cardiac stimulants of the digitalis group seem to exert a harmful effect when injected in acute anaphylaxis.

Blood coagulation is delayed; a loose clot forms after one-half to two hours.

Antianaphylaxis is produced when the animal does not succumb to the injection.

When anaphylactic death is delayed for about one hour, a well-developed rigor of the white muscles of the thigh and of the diaphragm may occur while the animal is still alive.

Friedberger's statement, that the lungs of guinea-pigs dead from acute anaphylaxis are not characteristic of anaphylaxis for this animal, is shown to be baseless.

BLINDNESS FOLLOWING THE ADMINISTRATION OF ORGANIC ARSENIC.

MCALESTER in the *Journal of the Missouri State Medical Association* for October, 1911, discusses this topic and says that from the combined reports the following facts are gathered:

The toxic effect of all organic arsenic compounds is somewhat different from that of the inorganic arsenic, tinnitus, deafness, vomiting, pain, and anuria being chiefly clinical manifestations. With "606" eruptions resembling scarlatina may appear with the development of a temperature that may rise to 104°. This usually occurs from the eighth to the tenth day, and resembles the effect of serum treatment—the effect of the antigen creating the toxins. The field of vision becomes contracted first, more so on the nasal side, blindness finally resulting. The process is that of quinine amblyopia without the recovery.

Ophthalmoscopically there are to be seen fine vitreous opacities, narrowing of the arteries, and finally a typical picture of optic atrophy. The progress of the atrophy varies from a few weeks to a year or more.

It appears that the previous use of arsenic predisposes the individual to the influence of other arsenic compounds. Watermann thinks that tabetic atrophy, alcohol, mercury, and arsenic render the patient more liable to arsenic amblyopia.

There is little to be gained from the study of the dosage or the method of administration. It cannot be decided from the data in hand whether bad results are from too great single doses, or from making them too close together, or giving too much *in toto*. From existing data one can arrive at any conclusion, but it seems that the small, often repeated dose is the most dangerous. It may be because this has been the usual method of administration. As Schrimmer and Beck point out, it is uncommon for two doses following each other at short intervals to produce blindness; still it does occur, and it is much safer to give one large dose, Ehrlich's "dosis magna sterilisans," than small, often repeated doses. The amount of the dose of these substances varies as the toxicity varies. Some patients have stood enormous doses of atoxyl, while atrophy has followed eight doses of 0.1 gramme.

BUTTERMILK AS AN INFANT FOOD.

This subject is considered by NEFF in the *Journal of the Missouri State Medical Association* for October, 1911.

He does not believe that buttermilk should be considered as a substitute for sweet milk in the feeding of healthy infants.

His experience proves to him that the

cases for the feeding of buttermilk as for any other form of milk should be selected, and that the daily weight and other evidences of gaining should be closely watched.

Buttermilk is more especially suited to sick infants, those with marasmus, chronic enterocolitis, exudative diathesis, and those that are commonly termed difficult feeding cases.

It may be given for a period of several months without causing unfavorable symptoms, and top milk may be gradually added if desired.

It is especially of value in the summer months, at which season it will be better tolerated and will produce better stools than the same case would have done on a sweet milk mixture.

Chilling and proper handling of a clean fresh milk is essential to the successful administration of, and good results in, buttermilk feeding.

RELATIVE EFFICIENCY AND DANGER OF THYMOL AS COMPARED WITH OTHER REMEDIES FOR HOOKWORM DISEASE.

SCHULTZ in the *Journal of the American Medical Association* of September 30, 1911, concludes after a study of beta-naphthol, male-fern, eucalyptus, chloroform, and thymol that he is justified in reaching the following conclusions:

1. Any practical vermifuge to be effective in expelling uncinaria or ankylostoma must be an irritant of sufficient intensity to cause the parasite to loosen its hold.

2. It should paralyze the neuromuscular apparatus to hinder the parasite from making fresh attachment.

3. Its relative toxicity for the parasite must be either much greater than that for the host or be much more readily absorbed by the former than by the latter.

Each of the above remedies is absorbed more or less from the alimentary tract, and Tenholt has even gone so far as to assume that only such drugs as are absorbed can be active in expelling ankylostoma. Since their method of taking food is by way of the mouth they must of necessity be poisoned by ingesting the tissues of the host already impregnated with the toxic substance, and if the host does not absorb sufficient thymol, beta-naphthol, male-fern, etc., they remain fixed to the intestinal mucosa and are not expelled by the purgative.

The author's present experimental data suggests that this is at best only a part of the truth. It happens that drugs like thymol when combined with iodine or the benzole radicle are much less active vermicides than thymol itself. It is also true that thymol iodine, being much less soluble than thymol, is absorbed to a less extent by the intestinal mucosa. *A priori* this would seem to support the idea of Tenholt that thymol iodide has no action on hookworm because none of the drug is absorbed by the host. But if the worms themselves be studied in contact with solutions each of thymol and thymol iodide it is possible to explain the reaction of the worms toward the two drugs on the basis of amount of drug in actual contact with the parasite and the effect of introducing the iodine atom into the molecule, and thus lowering its toxicity. While, therefore, the drug absorbed by the host and ingested by the parasite as a part of the cell and plasma may have a toxic action on the worms, it seems that such drugs as thymol, male-fern, chloroform, and beta-naphthol act by direct contact with the worms, causing rapid vermiform movements, and if the irritation is sufficiently great the worms finally attempt to escape. From now on until paralysis sets in not a little of the surrounding media is ingested, since the mouth parts of the parasite are kept in constant action. At this stage the intestinal contents of the host ought to be expelled so as to get rid of the surplus drug and the poisoned or anesthetized worms. Judging from the action on the worms *in vitro*, two to three hours seem to be about the time when the cathartic should begin its work. In the case of chloroform and eucalyptus the cathartic in the form of castor oil works hand in hand with the chloroform.

In conclusion it may be said that at pres-

ent thymol is one of the most toxic vermicides for ankylostoma thus far proposed. It is easy to obtain, keeps well, is cheap, and is easily administered; it kills the parasites instead of merely paralyzing them. When taken under the care of a physician who is careful to gauge the dose in accordance with the physical condition of the host, it seems to be the best all-round remedy thus far studied. While dangerous in large doses, it differs from beta-naphthol, male-fern, and chloroform, in that the danger is at once apparent and can be controlled by heart stimulants and by methods that help maintain a good blood-pressure until the drug has killed the parasite and the cathartic has removed the excess of thymol. Whereas with the other remedies just mentioned the danger-signals are less obvious, and usually it is only after irreparable damage is done that one is aware that his patient is in danger of any after-effects.

Beta-naphthol is probably the next pure chemical substance that ought to be tried more extensively on human hookworm subjects. Persons affected with kidney lesions ought not to take it, and when used the urine should be examined to determine whether it causes albuminuria. If the maximum dosage of 2 to 4 grammes, divided into two parts and given an hour apart, does not cause renal disturbance in adults, beta-naphthol has much to recommend it as a hookworm remedy.

Male-fern at present has not much promise in this country because of the lack of care in collecting the rhizome and in preparing an active ethereal extract. This, however, is a condition which doubtless would soon be remedied if once considerable demand existed for an active extract.

At present there is but little reliable data as to the efficiency of "Hermann's mixture" for expelling human hookworms, or what percentage of cases might show after-effects. It seems unnecessary to add such an irritating oil as eucalyptus globulus, and if chloroform is used it ought to be given with plenty of oil. It is best to divide the maximum 3 Cc. dose, for a vigorous adult, into three parts, 1 Cc. of chloroform to 10 Cc. of castor oil, given at hour intervals. Should vomiting occur before the chloroform is taken, stop the treatment, and if necessary change to thymol or beta-naphthol. By thus regulating the dose of chloroform, the author has had excellent results with dogs; it has proven rapid in its action, and thus far not followed by any evil after-effects. Should the chloroform-castor-oil mixture act as favorably in human beings as it has in dogs, it will prove a universal worm remedy of great importance.

Finally it may be said that the best of remedies are but weak instruments of defense in stamping out this degrading disease. The weapon of offense must after all be proper disposal of fecal matter so that infection is rendered impossible. And what can be more effective in accomplishing this than the cultivation of a healthy public sentiment which will insist on its communal rights in this matter, protect the innocent, and by proper police regulation quickly punish the offender? To this end it would seem that the most effective line of attack is that led by Stiles and others who are endeavoring to educate the masses as to the importance of proper sanitation.

THE EFFECTS OF PILOCARPINE AND ATROPINE UPON THE AMYLOLYTIC POWER AND COMPOSITION OF THE SALIVA.

EWING gives these conclusions in the *Journal of Pharmacology and Experimental Therapeutics* for September, 1911:

1. The volume of the normal saliva, its amylolytic power, and the amount and percentage composition of solids secreted, remain approximately constant during a continuous period of secretion of six or eight fifteen-minute periods. If there is any change, it is a very slight falling off of the percentage composition of organic solids, and at times of the amylolytic power.

2. Pilocarpine reduces the relative amylolytic power of the normal saliva from 30 to 60 per cent. Although the relative amylolytic power of the saliva is much diminished by pilocarpine, the amount of maltose produced in the total volume of saliva

secreted in a given period, after the administration of this drug, is greater than that produced by the amount of normal saliva secreted in the same length of time. "The efficiency" of the secretion is therefore increased by pilocarpine.

3. Pilocarpine increases the amount and tends to increase the percentage of both the organic and inorganic solids of the saliva; the greatest increase is in the organic constituents, however. Any percentage increase of the solids is not nearly so great as the increase in the actual amount secreted.

4. Atropine diminishes the amylolytic power of the saliva from 15 to 30 per cent.

5. Both the amount and percentage composition of total solids secreted are greatly diminished by atropine. The decrease is in the organic constituents.

6. Pilocarpine and atropine affect the factors which influence both the "trophic" and "secretory" elements of the saliva.

7. The effect of pilocarpine and atropine upon the secretion or activity of the ptyalin of the saliva bears no definite relation to the action of these drugs upon the other physicochemical properties of the secretion.

TREATMENT OF VISCEROPTOSIS.

The *Australian Medical Journal* of September 16, 1911, contains an article by HONMAN on this topic.

When there is any doubt whether an abdominal support would give relief, the writer straps the lower abdomen with broad strips of Mead's plaster, and if the patient feels benefited by that (and he generally does) he uses the old strapping when removed as a guide to the belt; if the abdomen is tender and complaint is made of the pressure of the belt giving pain, he gets the colon washed out by enemata, and it is not an unusual occurrence to wash out undigested food that has lodged there for some days. In spite of the daily opening of the bowels by means of saline purges, in testing the time taken for the passage of feces through the bowels by means of charcoal, he has found that while charcoal comes through in the average normal time (twelve hours), yet washing out has brought away undigested food, such as pieces of oranges which have been taken two or three days before. He therefore begins the treatment by taking care the colon is completely emptied.

The writer has abandoned kidney trusses and kidney pads, as he considers by increasing the pressure on the upper abdomen they aggravate and increase the bowel drop. In only one case did he see any benefit derived from a kidney truss (and that was in a case in which torsion of the kidney produced most of the symptoms), and has recourse only to belts which support the lower abdomen, supplementing the support in some cases by a pad occupying the lower abdomen, and in others by a light spring fixed in front and drawn back by means of straps attached to the back of the belt. In all cases he recommends them to be applied lying down, and to be worn constantly.

In some cases the patients object to their use on the score of their figure, or the trouble in putting the belts on. In these cases he recommends the straight-front corset, so that pressure can be exercised on the lower abdomen. This is very useful, and it does away with the crutch piece, which is so objectionable to most patients.

A support which was devised by a patient who was herself a great sufferer from kidney and bowel drop, and which is very satisfactory, the author describes. Attached to the lower part of the front of the stays are two flaps with buckles, which are drawn back by two straps of surgical webbing, which are fixed to the ribs of the stays at the back. He thinks in many cases this supplies the support required.

The medicinal treatment chiefly consists in treating the constipation; enemata to empty the bowels being preferable to strong purgatives, and correct dieting with the administration of liquid paraffin (its greasiness, however, is found to be very objectionable to some patients), are of the greatest help to remedy this. He has found that a pill with colocynth and cascara, with one-third

of a grain of extract of belladonna and nux vomica each, is the best form of aperient.

The general health should be improved by tonics; massage and electricity should be used to endeavor to restore the tone of the abdominal muscles. Considering that visceroptosis results from the dragging of the hepatic flexure on the transverse colon when it is not properly fixed, plus of course the predisposing causes, the author has endeavored to remedy this condition by operation. His attention was first called to this being the case by an article by Mr. Stanmore Bishop in the *Lancet* of August 3, 1907, and since then he has adopted his method in nephroptosis, adding to it an additional fixation of the hepatic flexure to the lateral posterior wall—a step which he has only recently found is advocated by Earl Harden, of Cincinnati.

That the dragging of the colon pulls down and partly occludes the pylorus and interferes with the gall duct is, he thinks, undoubted, and with the relief from this drag the symptoms are alleviated—at any rate, after a period of some years, the patients still expressing themselves as being relieved.

TREATMENT IN CIRCULATORY DISORDERS.

In the *Boston Medical and Surgical Journal* of November 2, 1911, LAWRENCE tells us that for the past six months he has been studying the effect of different preparations used for lowering the blood-pressure. For this purpose cases were selected which had a systolic pressure of 180 mm. or over. During the observations the patients were on a limited, definitely measured amount of liquids, and on a diet which did not vary from day to day. The amount of urine excreted was carefully measured and recorded. Observations were taken with the Faught sphygmomanometer, having an arm band of 12 mm. in width. Observations were taken twice daily, and at the same times each day, under all possible precautions to exclude the influence of meals, mental disturbance, etc. The drugs studied have been nitroglycerin, sodium nitrite and erythrol, mannitol, and a preparation called vasotonin. The effect of venesection, hot-air baths, high-frequency and electric light baths was also studied. Systolic and diastolic pressure and the pulse-rate were recorded at intervals of five to ten minutes, according to the drug studied, through the observation.

As Dr. Arnold has found, so also has the author, that nitroglycerin has an effect lasting about ten minutes, and he got no greater fall of pressure than 15 mm.

Sodium nitrite begins to act in ten to fifteen minutes; the maximum fall is reached in about twenty minutes and lasts twenty to thirty minutes, the original pressure being again reached in about two hours. The maximum fall obtained varies from ten to forty millimeters.

Erythrol produces about the same effect, except that the return of the original pressure is slower.

Mannitol gives about the same results as erythrol.

With all these it is essential to work with a fresh preparation, as old drugs have been found to be inert. This has been especially marked in the case of erythrol.

With vasotonin, a combination of yohimbim and urethan, the author has had rather surprising results. Reports from Germany state that both in animals and in man it caused a fall of from 20 to 40 mm., which lasted from four to six hours, and that three to four injections during as many days would maintain the blood-pressure at a level lower than the original for about a week. In the five cases he has studied the results have been exactly opposite, the injection of the drug being always followed by a rise in pressure, and occasionally accompanied by more or less serious disturbances; one case showing a severe attack of angina pectoris, coincident with the rise in pressure. The duration of the rise averaged from two to four hours.

Venesection in the few cases he has had opportunity to study produces a gradual fall of from 10 to 40 mm., which is maintained for sixteen to twenty-four hours.

Hot-air baths, electric light baths, and

high-frequency are not constant in the effect produced, causing a fall of 10 or 15 mm. in about half his observations. In an equal number no result was observed.

In all cases a fall in systolic pressure, caused by any of the above-mentioned methods, was accompanied by a similar, although less marked, fall in diastolic pressure, and usually by a temporary acceleration in the pulse-rate. Respiration occasionally showed a temporary quickening.

In eighteen cases the author has studied with Dr. Edward Young the effect of a lowered pressure on the elimination through the kidneys. Their method was to perform the Geraghty test at different levels of pressure, the amount of dyestuff and of urine being carefully estimated at such levels.

In fifteen out of the eighteen cases more urine and more coloring matter was excreted at a lower pressure than at a higher one. The differences in some cases were small, but in all but three were outside the limit of error. In three cases the better excretion was obtained at the higher level of pressure. The tests at the different levels were performed as near each other as possible, in order to eliminate the possibility of any change in the condition of the patient other than that produced by the change in blood-pressure.

These results are rather surprising, and not in accord with the general clinical idea of the effect and purpose of high blood-pressure. The author has found in the literature a few articles reporting isolated cases in which the use of vasodilators was accompanied by increased excretion of urine, but no explanation for the occurrence has been offered, and he has none.

The fact, however, that the pressure may be lowered and thus lessen the work of the heart without lessening the excretion by the kidney seems to be important.

ARNOLD, writing on this subject in the same issue of the same journal, says that it is well recognized that digitalis or its preparations do not agree with some cases of myocardial degeneration. Consequently, it must always be used with caution in this condition. He does not think we can yet satisfactorily explain why it does not agree with some of those cases, nor can we always tell beforehand whether it will agree or not. However, the author asserts he has been more and more impressed with its usefulness in these cases, if the amount is properly adjusted. It is rare that two or three minims (or five drops) of the tincture, repeated twice a day, will do any harm, and it is safer not to begin with more than five minims (or ten drops) three times a day. It is relatively slow of absorption, and consequently its effects are not quickly realized. Ordinarily in a day or two we can tell whether its effects are to be good or bad, and whether the dose is sufficient to produce results. It is well to stop at a dose that is producing recognizable improvement, rather than to increase the dose in the hope of securing more rapid progress. It is easy to give too much, and, owing to its slow elimination, any undesirable effects that it causes may last some time. Because its action persists for some time on account of slow elimination, it is almost always safe, when one suspects the dose is too great, to omit it for a time and watch the results. If conditions become better, one is giving too much; if they are not as good, one is warranted in cautiously increasing the dose. In some cases the dose must be increased considerably before favorable results are obtained. This is especially true when there is present a relatively recent dilatation of the heart.

The limits of the author's paper do not permit a discussion of the merits of different preparations of digitalis, nor the variability of the strength of the same preparation as obtained from different sources. However, he does state that, if the action of the drug is studied intelligently in a case, one can generally get satisfactory results from any standard preparation obtained from a reliable druggist. He is aware that experiments show considerable variation in the strength of those preparations, yet in any supposedly reliable preparation there is sufficient strength to get results if the dose

is properly adjusted. Our present knowledge of the chemistry and physiological action of various preparations from digitalis is so unsatisfactory, and our knowledge of its exact action in different circulatory conditions is so imperfect, that the use of this drug in any given case is now essentially experimental rather than scientific. While variability in strength is undesirable, after all it adds but one more uncertain factor that must be tried out experimentally in a given case. He does not wish to be misunderstood. He is in favor of securing uniformity in the strength of digitalis preparations as far as possible, and the best attainable is none too good, but he does wish to combat the idea that we must have a preparation of a given strength in order to get any results, and that nothing else is useful. Clinical experience does not warrant this deduction.

Objection is sometimes made to digitalis in these conditions under the impression that it increases the blood-pressure. In his experience this does not occur from small or moderate doses of the drug. When the blood-pressure is low because of lack of power in the heart-muscle, we may get a considerable rise in the pressure as the strength of the heart increases, but this is a desirable change.

Strychnine is a very useful drug in these conditions where better cardiac action is desired. Here, again, moderate doses have no effect in raising the blood-pressure, unless it is low because of cardiac weakness. The author rarely uses it in doses larger than 1/60 grain at the beginning, and often in doses of 1/100 grain or less.

Returning to the problem of the treatment of high pressure, it is very desirable to reduce the blood-pressure. The commonest measure employed to secure this result is the use of vasodilator drugs, like nitroglycerin. Sometimes very gratifying results are obtained in this way—at least for a time. Often, however, the action is transitory or no appreciable improvement is secured. As the action of the drug is rather fleeting, it should be given at frequent intervals, and preferably in as small doses as will produce any appreciable result. When it is needed at all it should be given as often as once in three hours. The dose should be 1/100 grain, or less.

The effect of nitroglycerin on the blood-pressure, as we measure it, is usually lost in about half an hour. Yet the writer asserts he cannot believe that this tells the whole story of its usefulness. The beneficial effects certainly last longer than that in many instances, and one can certainly detect a different quality in the pulse for two or three hours, although the systolic blood-pressure, as we determine it, has returned to its former high level.

Nitroglycerin in his experience rarely lowers the blood-pressure more than 10 mm. for any length of time. Even this small gain is a great help to a laboring heart, and this drug (or one of the other vasodilators) is often a most valuable aid in treatment. It is useful even when the blood-pressure is moderately low, if it is low because the heart is failing.

The cardiac tonics and the vasodilators comprise the drugs that have a directly useful effect on circulatory disorders of the type that is now being considered—where a weak heart is struggling against a blood-pressure that is high as compared with the heart's strength.

Of cardinal importance is rest from physical exertion. This must be more or less complete, according to the needs of the case. Little need be said on this point, for the necessity of physical rest is generally recognized by the profession. Freedom from mental activity and worry is less generally recognized as necessary, but it is of great importance. The diet should be light and easily digested, but must contain sufficient nourishment, otherwise it is impossible to build up a strong heart. The bowels must be regulated so as to secure free elimination from the alimentary canal.

Hydrotherapy is not useful in this condition. The effect of baths that are either cold or hot is generally to raise the blood-pressure. Especially is this true of the Nauheim baths. These baths are so useful for certain chronic cardiac conditions that

a word of caution is needed about cases in which they are not suitable. Hinsdale summarizes the matter as follows: "A positive contraindication to such measures as the Nauheim bath, for instance, is any acute or subacute condition of the heart, or when, in chronic heart disease, compensation is lost. On the other hand, in cases in which there is at least fair compensation the effect of such baths is beneficial. There is improved assimilation and tissue metabolism, the area of a dilated heart is diminished, its strength is increased, and there is a distinctly beneficial effect on the nervous system."

ANESTHESIA DON'TS.

LUMBARD in the *Medical Record* of November 18, 1911, gives the following "don'ts":

1. Don't use ether or chloroform that is not transparent, colorless, neutral in reaction, or which leaves a residue upon evaporation.

2. Don't forget that the selection of the proper anesthetic is as important as its administration.

3. Don't forget that it is always your duty to use the safest anesthetic at your command.

4. Don't use an inhaler which cannot be sterilized.

5. Don't let convenience preclude safety in the selection of chloroform instead of ether, or ethyl chloride instead of nitrous oxide.

6. Don't forget that morphine, if properly used in well-selected cases, especially in alcoholics and athletes, is a valuable adjunct to a smooth narcosis, but should be given at least one-half hour before beginning the anesthesia.

7. Don't assume because your patient has been anesthetized once without bad results that you do not have to be on the alert in future administrations.

8. Don't forget there may be danger although the patient has no organic disease.

9. Don't forget that the excessive use of tobacco will often prevent a smooth narcosis.

10. Don't always expect a smooth anesthesia with patients who are "bad travelers" on land or sea.

11. Don't forget that no one anesthetic will do for all cases under all circumstances.

12. Don't be governed by percentages of the amount of anesthetic used, but by the condition of the patient.

13. Don't forget that the respiration is the most important thing to watch, no matter which anesthetic is employed.

14. Don't forget that the depth of respiration is the most trustworthy of all signs.

15. Don't forget that the greatest factor of safety lies with the experience of the anesthetist more than with the anesthetic or inhaler used.

16. Don't forget that there is always a chance for any patient to act badly and possibly die under the anesthetic.

17. Don't forget that oxygen added to ether or chloroform will often make a narcosis safe that would not be so otherwise.

18. Don't forget that it is easier (and much safer) to add to than to subtract from when administering anesthetics.

19. Don't be afraid to give anesthetics in chronic cardiac, pulmonary, and renal conditions.

20. Don't forget that most trouble in the administration of all anesthetics comes from using too much.

21. Don't forget that the color of the ear is a very good guide for the beginning of cyanosis.

22. Don't resort to intratracheal or rectal anesthesia when simpler and safer methods will accomplish the same purpose.

23. Don't expect to relieve mechanical obstruction in the respiratory tract by hypodermics.

24. Don't watch the operation, even if you can do so without neglecting your patient; it does not inspire the surgeon's confidence.

25. Don't attempt to secure deep anesthesia in empyema cases; use just as little of the anesthetic as possible.

26. Don't forget that surgical shock may apparently deepen the anesthesia and cause alarming symptoms.

27. Don't forget that it is illegal to have

a nurse administer an anesthetic in the State of New York.

As to chloroform:

1. Don't let the surgeon hurry the anesthetist, especially when using chloroform.

2. Don't have too much covering on the mask when giving chloroform. Always give the patient plenty of air.

3. Don't administer chloroform with the patient in the sitting posture.

4. Don't advise long or deep inspirations when using chloroform.

5. Don't forget that the majority of deaths under chloroform have occurred during the first period of its administration.

6. Don't forget that while the toxic effects of chloroform often show themselves very suddenly, they may be delayed for days.

7. Don't assume because you have used chloroform with good results in obstetrical cases that you may use it promiscuously in all other cases. Chloroform is not free from danger in obstetrical cases.

8. Don't use chloroform in obstetrical work when the uterine contractions are feeble and the fetal heart cannot be heard.

9. Don't use chloroform in a small room lighted by gas.

10. Don't lose sight of the eye reflexes when giving chloroform.

11. Don't administer chloroform by a closed inhaler.

12. Don't charge a patient up with chloroform, as is so often done.

13. Don't use chloroform for the removal of tonsils and adenoids.

14. Don't forget to add a few drops of ether when using chloroform.

As to ether:

1. Don't forget that ether is a stimulant, while chloroform is a depressant.

2. Don't forget that ether usually gives warning of approaching danger, which chloroform is not apt to do.

3. Don't forget that ether has a larger latitude for safety than chloroform; but do not abuse it.

4. Don't rely on this comparative safety of ether and allow its administration by a novice unless absolutely necessary.

5. Don't forget, generally speaking, that ether is much safer than chloroform and certainly should have first choice—other things being equal.

As to nitrous oxide:

1. Don't be alarmed at slight cyanosis when using nitrous oxide.

2. Don't forget that jactitation, when using nitrous oxide, calls for more oxygen.

3. Don't forget that nitrous oxide can be given safely at any age.

4. Don't forget that nitrous oxide and oxygen is the safest anesthetic known, but it is not always satisfactory to the surgeon.

5. Don't fail to have a witness when inducing anesthesia, especially when using gas. Many lawsuits have resulted because this precaution was not taken.

6. Don't forget to empty the bladder before giving gas to children, as they often urinate while under its influence.

7. Don't forget that nitrous oxide is the safest anesthetic for short operations and examinations.

8. Don't expect a good anesthesia when using nitrous oxide on alcoholics.

In relation to the patient:

1. Don't starve or purge a weak patient too much prior to anesthesia.

2. Don't forget to secure the patient's confidence before commencing the administration of the anesthetic and begin very slowly and quietly. Allow neither talking nor noise in the room. You will thus contribute to a smooth narcosis.

3. Don't forget to ask the patient if he is accustomed to sleep with his head high or low, and govern yourself accordingly when administering the anesthetic.

4. Don't forget that the nose, mouth, stomach, bowels, and bladder should be empty before beginning anesthesia.

5. Don't forget to have teeth, nose, and buccal cavity clean before giving the anesthetic.

6. Don't forget to keep the patient warm at all times.

7. Don't forget to wash out the stomach when it is full. The anesthetic will act more quickly and more safely.

8. Don't forget that the change of pos-

ture may add greatly to the patient's comfort and safety.

9. Don't forget to give a drug fiend his usual dose before anesthetization.

10. Don't worry about the pulse if the respiration and the color of the face are satisfactory.

11. Don't be alarmed when the pulse is a little weak or rapid. Look for the cause and remedy it.

12. Don't go over the safety line in trying to relax the abdominal muscles in acute conditions.

13. Don't forget to withdraw the anesthetic immediately when you have a widely dilated pupil, fixed eyeball, and eyelids partly open. This means that too much has been given.

14. Don't forget that a dilated pupil with a moving eyeball means that not enough has been given.

15. Don't forget to drain the mucus from the mouth by means of a gauze wick or suction apparatus.

16. Don't deceive children about to be anesthetized.

17. Don't forget, first, last, and all the time, to keep your whole attention fixed on the administration of the anesthetic.

QUININE IN THE PREVENTIVE TREATMENT OF MIGRAINE AND ANAPHYLAXIS.

HERZFELD in the *Journal of the American Medical Association* of November 18, 1911, reminds us that in a paper read before the German Medical Society of New York, February 18, 1908 (*Therapeutische Monatshefte*, May, 1908), the author tried to establish the fact that typical attacks of migraine had their origin in the gastrointestinal tract, and were due to autointoxication caused by the absorption of certain albuminoids. At the time the tendency was against his hypothesis, but subsequent devolopments in the causation of a varied series of vague diseased conditions are now being referred to as an outcome of the absorption of certain albuminoids giving rise to the condition now known as anaphylaxis, to which class the syndrome known as migraine or hemicrania is now referred. The author himself has been subject to such attacks; during an attack of gastrointestinal disturbance, certain food products which he can at other times eat with impunity immediately cause an attack of migraine. This led him to attempt to find some medicament which would abort such attacks. Once an attack has reached the severe stage of pain, no abortive treatment is of any avail; only palliative measures are useful. (These measures are described in detail in the above-mentioned paper.) During the early stages, however, in the time of the gastrointestinal disturbance, and during the stage of scotoma, quinine is the remedy *par excellence*. He has found, after having tried all the various forms of treatment, in the early stages, that quinine is the most effective and is also specific. But it must be given early, at the onset, and in sufficiently large dose. He asserts he has never seen any ill effects from quinine thus administered. He has usually given seven grains each, and he has rarely found it necessary to repeat the dose. He calls attention to the employment of quinine in other conditions considered as anaphylactic—*e.g.*, urticaria of all grades; others have also found it useful in this condition. In serum exanthemata he has used it in two cases, but as they were of rather mild character he is not able to say positively that the rapid improvement was due to quinine alone. In hay-fever it has been of distinct advantage, though he has always used it in conjunction with adrenalin applied locally.

TREATMENT OF RHUS POISONING.

HEMMETER writes to the *Journal of the American Medical Association* of September 30, 1911, that he has considered two etiologic factors in this state. In the first place, it is known that the active poison is an essential oil, and therefore only solvents for oils which have a greater affinity for it than the cutaneous cells can remove it. In the second place, it becomes evident from repeated microscopic eaxminations of the

discharge that all severe cases, at least, are mixed skin infections, due to an invasion of bacteria—even pyogenic cocci—after the rhus had entered.

The first indication is met by an alkaline hot bath (ammonia or bicarbonate of sodium) added to a hot bath and liberal rubbing with ethereal antiseptic soap. Thereafter the parts are bathed in 85-per-cent alcohol and dried.

The second cause is met by the yellow oxide of mercury ointment most effectively:

℞ Unguent. hydrargyri oxidi flavi, ℥ss;
Morphinæ, gr. ij.
M. ft. unguent.

There is, however, a third factor, the distress of the itching and the discharge. For this, after going through the above treatment in the morning, the following ointmnet should be applied at night:

℞ Bismuthi subgal., 100 mins.;
Adrenalin chloride (1:1000), f℥v;
Lanolin, f℥j;
White petrolatum, q. s. ad ℥j.
M. ft. unguent.
Rub in liberally, then dust with an antiseptic powder.

The yellow oxide of mercury ointment must precede this and the patient must avoid the locality where the rhus grows. The ethereal soap cannot be used around the eyes. Out of fourteen patients, ten were cured in eight days, and the method soon acquired the reputation of a specific. Seven cases were so severe that the sufferers were confined to bed from four to eight days. The alkaline bath should be taken daily.

THE DISADVANTAGES INCIDENT TO THE ADMINISTRATION OF SALVARSAN.

MONTGOMERY, in the *Journal of the American Medical Association* of November 18, 1911, asserts that at present very few men rely on salvarsan in the treatment of syphilis. It is now used in conjunction with the other two great specifics, mercury and iodide of potash. On informing a patient that salvarsan is not an absolute specific for syphilis, clearing up the disease and all its manifestations at one stroke, it is interesting to watch the mental reaction that takes place. The patient almost invariably concludes that the remedy is worthless. Yet a medical man, for the sake of his own reputation, must tell the facts of the case. Furthermore, it is dangerous to tell a patient that he is cured, for then he is thrown off his guard in case further manifestations of his disease should appear.

Another feature tending to diminish the popularity of this remedy is the difficulty surrounding its administration. It cannot be taken by the mouth, and if given either intravenously, intramuscularly, or subcutaneously, it has to be prepared with minute care, and the injection has to be carried out under the strictest antisepsis, as the drug itself is an irritant, but not an antiseptic.

Many drugs, such as morphine and cocaine, are so bland in their action on the tissues that we never expect any local trouble to follow their hypodermic use. Others, while irritant and harmful, are at the same time antiseptic, and therefore the injured or necrosed tissues are not exposed to the additional danger of sepsis. One of the great points in favor of the administration of salicylate of mercury intramuscularly is that this particular preparation is so slightly soluble as to act almost as powerfully as an insoluble mercurial salt. Among the drugs used subcutaneously or intramuscularly, salvarsan is distinguished by its injurious action on the tissues, and often gives rise to local necrosis. K. Martius found that it did so in every case he investigated. Once, where the injection was thrown into the gluteal muscles, there was no tendency to heal, although three months had elapsed. In two instances the necrotic mass had to be excised. Salvarsan, however, although it acts so injuriously, is not an antiseptic, and therefore if the technique is not perfect, and germs happen to be included in the injection, they have an excellent opportunity to develop in the injured or helpless tissues. Septic infection, sometimes fatal, may therefore be a consequence of the administration of this remedy.

When salvarsan causes an arsenic necrosis that involves the whole skin, an ulcer results that is very slow in healing, and there is no telling when such an ulcer may develop. The author has seen a patient get a necrotic ulcer from an injection of salvarsan who, several weeks before, had received an injection that passed off without any more than the ordinary inconveniences.

Then again, when salvarsan is given either subcutaneously or intramuscularly, the drug may not be absorbed. Schreiber had a patient, a doctor, who became so tired of the annoying deposit of salvarsan as to beg to have it cut out, and over 80 per cent of the drug was removed from the local deposit. The author has seen a number of deposits, and the percentage of their occurrence must be quite high. In many instances they lie almost inert in the tissues, causing pain only when pressed on, while in other cases they are very annoying. When the deposits are very annoying the patient may ask to have the sac emptied, and the affair ends. When such a deposit is inert it is a question what to do with it—whether to leave it alone or to advise its removal. If left alone it might possibly give rise to arsenic poisoning by slow absorption, although the author asserts he has never seen it do so. When the remedy lies unabsorbed, it, of course, does not act as an antisyphilitic, and may, if solely relied on to combat a progressive, destructive gumma, occasion serious loss of time. In other words, it constitutes a delay in treatment, possibly at a critical moment.

The intravenous method is undoubtedly to be preferred, as when the patient receives the dose he has it then and there in sufficient quantity, and with little fear of any local trouble. But this way of administering salvarsan constitutes a surgical operation, demanding skill, intelligent care, and the strictest antisepsis, and more care and time indeed are here necessary than in many more pretentious operations. Above all things, an absolutely perfect solution must be obtained, as the injection of solid particles into the venous circulation is not permissible. So important is it to get a faultless solution that Schreiber always kept this step under his direct supervision. The author never saw him give the actual injection into the vein, but he never saw an injection given in his clinic wherein he did not supervise the dissolving of the salvarsan. The greatest care is also necessary to keep adventitious particles out of the fluid. Sterilized distilled water should be used in making the solution, and no cotton should be employed in stoppering the bottles or in wiping the instruments, lest cotton threads get into the fluid. The solution injected into the veins should not be a concentrated one, as it is an axiom that even harmless salts, when employed intravenously, should be well diluted. Furthermore, if by accident some of the salvarsan solution should escape into the subcutaneous tissues, it irritates far less when highly diluted than when concentrated. A concentrated deposit of salvarsan at the bend of the elbow, where it may annoy for weeks, is not pleasant.

Another important point in the intravenous injection is that the lumen of the needle should be free of rust. The blood in flowing out through a rusty needle is far more apt to clot than if the bore of the needle is smooth. This clot would naturally be injected into the vein in the course of the operation. The author has also seen thrombus of the vein, presumably from the mere injury of the operation. The only symptoms were edema of the arm with some functional incapacity, and a cord-like hardening that cleared up in a short time.

An annoying feature, although a fleeting one, is the severe pain at the shoulder that patients often complain of after about 100 Cc. is injected. This may necessitate stopping the injection for a few moments in order to allow the circulation to readjust itself.

What is called a Herxheimer arsenical reaction may occur on the skin in the course of the first few days. It is a bright-red erythema, usually best observed on the trunk, and the author has never seen it give rise to any further disturbance. It is as well to know of its existence, however, as misunderstandings may otherwise occur.

The salvarsan reaction in the syphilitic lesions themselves is highly important. When, for example, there are a great number of very active syphilitic lesions, as in early malignant syphilis, the temperature reaction may run as high as 105° F. It is therefore important to be careful when there are many lesions, and when there is a low cachectic condition. He has never seen any deaths arise from this source, but at times there are serious inconveniences. In such cases Schreiber advises giving half the usual dose, followed in a week by the other half. Usually, the temperature reaction comes on quite early in all syphilitic lesions excepting those of the central nervous system. The temperature reaction in lesions other than those of the central nervous system occurs at about four or five hours after the injection, while in lesions of the central nervous system it occurs at about from eight to ten hours afterward. This difference is so regular in its occurrence that it may be used for diagnostic purposes. When no syphilis is present, no temperature reaction occurs. The experience of Schreiber is particularly interesting in this respect. Knowing how frequently arsenic is prescribed in psoriasis, and how excellent the results sometimes are, and knowing also that in many instances the favorableness of the result bears some relationship to the size of the dose, he hoped to achieve success in psoriasis by injecting salvarsan, which contains such an enormous quantity of arsenic. The psoriatic patients injected showed no temperature reaction whatever, nor had the drug the least effect on the eruption.

There is not alone a temperature reaction in cases of syphilis in which salvarsan is injected, but there is a marked reaction in the lesions themselves. They become redder and more swollen. The drug acts in this respect somewhat like tuberculin in tuberculosis. As may be readily seen, this is an important matter when it comes to the question of administering salvarsan where the affected organ is of great dignity, as in cases of gumma of the heart or of the brain. If a patient has gumma of the brain, from which he is suffering severely from the pressure of the tumor, the sudden enlargement of this tumor, consequent on the local reaction, may be of the greatest importance. For the same reason, if a patient has gummatous softening of an artery, giving rise to an acutely dilating aneurism, a dose of salvarsan by increasing the quantity of blood sent to the part may cause irremediable damage. The action of mercury and of potassium iodide is quite a contrast to this, as under these remedies there is no increased afflux of blood to the affected part, but rather a slow melting down of the syphilitic infiltration. Of course, in a patient suffering with aneurism the drug should not be administered intravenously, as the fluid itself would dangerously raise the arterial pressure.

Finally we come to a disadvantage in the administration of salvarsan, which may count for nothing in an altruistic or scientific sense, yet from a practical point of view is of great importance. It is not a remedy to use in office practice or in an ambulatory clinic. The patient should be sent to a hospital, and this in itself constitutes an expense which many patients cannot afford. Even when given intramuscularly or subcutaneously, the administration of salvarsan consumes considerable time, and the physician's time counts for something. When given intravenously a very considerable amount of time is consumed, as the technique amounts to a surgical operation, making its administration still more expensive. This expense the patient might cheerfully undergo if the physician were able to assure him that his troubles would thereby be ended, but we are far from being in a position, even after several injections of salvarsan, to assure the patient that he is permanently cured. In the present state of our knowledge, we still are compelled to advise the patient, although he has taken salvarsan, to take mercury and potassium iodide.

An enumeration of the disadvantages of this new drug serves only to throw into still bolder relief its great advantages. The wonder grows that such a powerful spiril-

licide can be thrown in such quantities into the circulation with such little risk to the host. In contemplating this marvel, we begin to appreciate the fine scientific imagination of the man who made this possible.

THE ACTION OF ARSENIC ON THE SKIN.

WASHBURN in the *Wisconsin Medical Journal* for October, 1911, states that the exact way in which arsenic brings about changes in the skin has been a subject for much speculation and theorizing, and the author does not attempt a full exposition of the subject. Liebig held that it acted by entering into chemical combination with the protoplasm of the cells and thus arrested activity. The reverse of this, however, seems nearer the true explanation of the facts.

Arsenic does not combine with albumin and does not arrest cellular activity, but on the contrary it stimulates the protoplasm to greater activity.

This stimulation, according to Binz, is due to the liberation in the tissues of oxygen. Arsenic forms two oxides, one with two atoms of oxygen more than the other. When As_2O_5 comes in contact with air, water, and organic matter, it is reduced to As_2O_3, thus liberating two atoms of oxygen. This reduction takes place only where protoplasm is alive or dying. It will not occur in dead matter. Other elements have been found to have this same property of carrying separable, energetic atoms of oxygen; among these may be mentioned lead, phosphorus, antimony, bismuth, and nitrogen.

When oxygen is liberated slowly and in moderate quantities, the result is a formative tendency. This theory is borne out by the fact that if arsenic is fed to horses and sheep there is improvement in the condition of the hide, as well as an increase in size. Giess found that by feeding arsenic to rabbits he could make them grow to enormous size. If, on the other hand, the respiratory process is accelerated and the oxygen is rapidly given and taken, the nutritive processes of the cells are hurried on beyond their power of endurance. The result then is exhaustion, degeneration, atrophy, and finally death of the tissue.

Epithelium shows an extraordinary affinity for arsenic. It is therefore natural to find a great variety of skin lesions in arsenical poisoning.

The drug is carried to the basal layer and passed on from cell to cell, being finally cast off in the desquamating scales and hairs. The changes produced are essentially nutritive, the tissues in the early stages presenting a condition of well-being. Under continued action, degeneration processes and deposit of pigment take place. Still later there is atrophy, and the epidermis may be very much reduced in thickness. In very advanced cases there is degeneration of the glands of the skin, the sweat and oil glands.

It thus becomes evident that, although arsenic is a drug which is of very great value in the treatment of certain diseased conditions, yet it must be borne in mind that we are dealing with a powerful poison, capable of doing a great deal of irreparable harm when used indiscriminately. It therefore behooves us to use this drug with caution and only where the indications are clear, especially when we are dealing with a chronic disease in which the medication must be continued over an extended period of time.

PRURITUS SCROTI.

The *British Medical Journal* of October 14, 1911, prints a letter from a well-known medical man, who signs himself "A Grateful Patient." The writer states that having passed through a long illness culminating in prostatectomy, he wishes to make a few remarks on his case. About six years ago he had the misfortune to sit rather forcibly on the wooden interval between two seats on the District Railway. Result—a short rupture of the urethra or a primary prostatic hemorrhage; he was in bed for four days, and the recovery was apparently complete. Nearly three years ago he was knocked down by a horse 'bus and kicked

by one of the horses in the perineum. Result—hemorrhage, suppression, and gradually ensuing catheter life. The catheter life became "total," and since eighteen months ago he could not pass one drop of urine. On December 26, 1910, he suddenly began to suffer agonizing pain every time the bladder contracted on the catheter. Hemorrhage was also frequent, and on June 30, 1911, he was relieved of intolerable life by prostatectomy. There were in the bladder, under the shelter of the overhanging prostate, three oxalate of lime calculi, with terribly pointed and sharp "spikes." The prostate was so large that it had to be trisected before it could be removed. Had he been attending any one else, he asserts, he should probably have remembered the *x*-rays; they never occurred to him, and so, although he states he does not know why, the presence of calculi was a surprise to him! Looking back on his symptoms he sees the unconscious vivisection he self-subjected himself to by not much sooner diagnosing the calculi. As to the operation, he has nothing to say except that at the age of 65 it has restored him to a sort of urinary adolescence! In fact, he is as well as he ever was in his life.

But there has been a point in his case which has a certain independent interest. For three months prior to his operation he had a most terrible form of pruritus scroti, and after several kind dermatologists had failed to cure it, one among them connected it with the prostatic condition, not knowing there were calculi in the bladder as well. But he warned him that soon after the operation the pruritus might not disappear at once. It still persists in a very minor degree, and is evidently on the up-grade as to cure. The hot summer has been against it and him, and perhaps cooler weather may assist toward its final departure. He asserts that the alleviation of the intolerable itching (especially at night) has been due to the local use of a preparation of Parke, Davis & Co. called "Emollientine," the formula of which is published, and he gratefully acknowledges his indebtedness to this preparation, as he must have tried quite twenty other combinations and hoped-for remedies, but—all failures! He has purposely withheld the names of every one concerned in his case, as he is sure that those to whom he is so indebted would wish. But he is also sure the moral of his case is this: Do not delay operation where the prostatic adenoma is an established fact.

ARTICULAR FIBRILLATION AND DIGITALIS.

MACKENZIE in his Schorstein Lectures on auricular fibrillation, published in the *British Medical Journal* of October 14, 1911, points out that not the least in importance of the discoveries resulting from the recognition of auricular fibrillation as a clinical entity is the light that is thrown upon the action of drugs of the digitalis group. The author here refers briefly to only a few points which he has been able to elucidate. He thinks every one who has carefully studied the description usually given of the effects of digitalis on the human heart cannot but be struck with the absence of agreement among the different writers as to the manner of its action, its dosage, and the best preparation. In some instances a peculiar reaction which the observer may have noted is looked upon as the characteristic effect of digitalis, but the mechanism of this peculiar reaction has not been understood. It is a good many years since the author's striking experience with the varied reactions which he obtained from the use of digitalis. He collected a great number of cases; in some he got a definite reaction on the heart, while in others no reaction was obtained. When he separated these into groups he saw that the probable reasons for the varied reactions in the human heart were that digitalis gives a reaction according to the nature of the lesions from which the heart is suffering. It will be observed that if this is found to be correct, we can at once understand how the physiologist and experimental pharmacologist have missed the most important effects of digitalis, for, so far as the heart in experimental work is concerned, they cannot

reproduce the conditions under which the physician has to employ the drug.

It is not only in auricular fibrillation that digitalis acts beneficially, for there are many other conditions which benefit by it; but cases of fibrillation stand apart from all others in regard to their response to this drug. All cases of auricular fibrillation are not responsive, for there are factors which render certain hearts unsusceptible, as the presence of fever or extensive fibrous degeneration. It is in certain cases in which there is a fair amount of healthy muscle that its almost specific action is seen. It is some ten years, Mackenzie asserts, since he realized this peculiar response to digitalis. When he was appointed to the Mount Vernon Hospital, and later to the London Hospital, he seized the opportunity to start a series of observations under conditions which permitted a degree of accuracy unattainable in private practice. In these observations the same drug and the same dose were given to patients with and without auricular fibrillation. With only rare exceptions all the cases that showed a marked effect upon the heart were cases of auricular fibrillation, for, although the other cases might exhibit some benefit from the use of the drug, they never showed the same tendency to slowing of the heart's rate.

The slowing effects of digitalis are shown in a very striking manner in those cases of auricular fibrillation in which heart failure set in with a great increase of rate of the heart. A patient suffering from extreme heart failure, in whom the rate of the heart was 140 per minute and very irregular, was given one drachm of digitalis per day, and after five days the pulse-rate fell from 145 to 70. At the same time there was a remarkable improvement in the patient's general condition.

The difference in the reaction of hearts affected with auricular fibrillation and those with the normal rhythm was well brought out in a comparison of six cases of mitral stenosis with auricular fibrillation with six cases of mitral stenosis with normal rhythm. The record began with the rate on the day previous to administration of the drug, and the rate in cases with auricular fibrillation was greater than the rate of cases with the normal rhythm. This, the author remarks in passing, is a point of some interest, for cases of heart failure with mitral stenosis with the normal rhythm rarely have as rapid a pulse as those with mitral stenosis with auricular fibrillation.

In each case the tincture of digitalis was given, one drachm per day, and was continued till nausea or vomiting ensued.

The author makes reference to the fact that digitalis in some hearts induces auricular fibrillation. When this occurs the rate of the ventricle becomes greatly decreased. The following experience will serve as an illustration:

A female aged twenty-one suffered from mitral stenosis following rheumatic fever. She also suffered from slight heart failure. The rhythm was normal. Digitalis was given and pushed till nausea occurred. No change took place in the rate or rhythm. She was then put on digitalis a second time; nausea again occurred, and at the same time there was a sudden fall in the pulse-rate, which became irregular. Tracings taken of the radial and jugular pulses showed that the auricle was fibrillating. The drug was stopped, and four days later, when he was examining her, the heart suddenly increased in rate, became quite regular, and the jugular pulse assumed the auricular form, showing, in fact, a sudden disappearance of the fibrillation and a return to normal. There was a remarkable slowing of the pulse-rate during the period of fibrillation from November 17 to November 20. In this case, as he said, the change from auricular fibrillation to the normal took place when he was examining her. He was particularly struck with the great increase of the rate when the rhythm of the heart became regular.

The peculiar response of hearts affected by auricular fibrillation to digitalis is one of such importance that it is bound to modify the attitude of the profession in its use of drugs of the digitalis group. It gives us for the first time a clear conception of

the reason that digitalis has acquired such a reputation as a cardiac drug. It helps us to realize why the drug has seemed so capricious in its action, slowing the rate in one patient and having no effect on another. By the pursuit of observations on the lines suggested, we are gradually obtaining a clearer conception of its effects on the heart itself, and on its nerve supply. The inquiry into this subject is turning out to be one of great interest. The reaction to digitalis varies in different cases of auricular fibrillation, and the reasons for this variation are enabling us to obtain a better insight into the mechanism of the heart's action. This research is, however, only beginning, and it means a long and patient observation of individual cases on the lines being pursued.

THE CLINICAL VALUE OF VON PIRQUET'S REACTION.

The *British Medical* Journal of November 11, 1911, presents this summary of our present knowledge of this subject:

The local reaction that follows in many tuberculous patients when their skin is vaccinated with Koch's Old Tuberculin was described by von Pirquet in 1907, and was at first acclaimed as an easy and trustworthy means whereby tuberculosis could be diagnosed. Since that day, however, much work has been done on the subject, and the diagnostic value of von Pirquet's cutaneous reaction has tended to fall steadily in the clinical market. Thus it was soon found that a positive reaction could rarely be obtained in patients with advanced or extensive tuberculous lesions, on the one hand; while, on the other, the great majority of healthy or apparently healthy adults were found to give a positive reaction. Before long it became the fashion to say that the presence or absence of the reaction was of little diagnostic value in an adult, and that the test was of clinical value only in the case of infants and children. Even with this limitation to its applicability, the test still gave results that could only be regarded as astounding by the clinician. For example, von Pirquet obtained a positive reaction in a quarter of all children aged one to two, a third of all children aged three to four, half the children aged five to six, and in two-thirds of all children aged from eleven to fourteen. To the clinician, as it has just been said, such figures are astounding, and if a positive reaction is to be taken as evidence that the patient is actually suffering from tuberculosis, incredible. But to the pathologist they seem to err by understating the facts; for Hamburger, stimulated by the clinical results furnished by von Pirquet's reaction, made most careful post-mortem examination of children dying between the ages of eleven and fourteen, and found evidences of tuberculous infection in no less than 77 per cent of them. Going further, and employing a more delicate form of the cutaneous reaction than von Pirquet's—namely, Escherich's modification of it, whereby the tuberculin is introduced subcutaneously—Hamburger obtained a positive reaction in 94 per cent of all children aged between eleven and fourteen years. Naegeli found evidences of tuberculous infection in 97 per cent of the bodies of adults coming to the post-mortem table, and so the conclusion seems to be that the vast majority of humankind, at any rate in Europe, become infected with tuberculosis years before they grow up.

If, then, practically every healthy adult gives a positive cutaneous reaction to tuberculin, the question naturally arises: Has von Pirquet's reaction any clinical value at all? The answer to this is: By itself, none whatever, excepting in infants. In infants, as Blümel points out, latent or stationary tuberculosis is rare, and up to the age of two years a positive reaction is strong presumptive evidence in favor of an active tuberculous lesion. At this age, therefore, it is of great utility in differentiating tuberculosis from other chronic wasting conditions, such as marasmus, bronchitis, posterior basic meningitis, and so forth. In older children there is a great danger, however, lest a positive von Pirquet reaction, taken in conjunction with slight dulness to percussion or slight abnor-

malities in the breath sounds at the apices of the lungs, should be held to be conclusive evidence of pulmonary tuberculosis. Such signs, definite enough in themselves, though uncertain in their interpretation, are common in schoolchildren with ill-developed chests, deficient muscular development, or obstructions in their upper air-passages. Now that the school doctor is abroad in the land, the temptation to label as tuberculous children with these signs of pulmonary collapse has often been found irresistible, particularly when a positive von Pirquet reaction has appeared to confirm the diagnosis of "active mischief in the lungs." But how far it is from confirming any diagnosis, excepting that the patient has at some time been infected with tubercle bacilli, will be at once obvious when it is remembered that two-thirds of all schoolchildren aged from eleven to fourteen years give a positive reaction, though only a small fraction of those are actually suffering from tuberculosis. In other words, von Pirquet's reaction alone does not enable us to distinguish between active and latent tuberculous lesions; but taken in conjunction with the physical signs and the course of any given case, it may be of great service in diagnosis, and particularly so when it gives a negative result.

It is true that there are certain conditions in which a tuberculous patient often fails to give a positive reaction, excluding for a moment advanced or cachectic cases: during an attack of measles, scarlet fever, enteric, or erysipelas, for example, particularly during the period of the rash; during pregnancy, especially after the sixth month; during a course of tuberculin treatment; and finally, in a certain percentage of patients with latent or inactive tuberculosis the reaction is, for some cause or another, negative, even when the more delicate modifications of von Pirquet's reaction are employed. In most of these conditions the practitioner would hardly be likely to apply the test, and it is only in a few of them, particularly in patients with latent tuberculosis in their lungs or lymphatic glands, that a negative result could mislead him. And even here his error would not be great, if he remembered that the negative reaction only proves that tuberculosis is either absent or latent, and that in the vast majority of his patients there does exist a tuberculous focus that may be called latent, inactive, quiescent, healed, or obsolete, according as his fancy dictates.

NITROUS OXIDE AND OXYGEN ANESTHESIA.

In the *Boston Medical and Surgical Journal* of October 19, 1911, MANDELL tells us that the cases in which he has used gas-oxygen include nearly the whole range of surgery, except nose and throat and brain work.

In many instances it has been necessary to give a drachm or two of ether with the gas (as the Davis apparatus permits) to produce the required amount of muscular relaxation. The patient is not cognizant of the condition, and this small amount of ether does not cause nausea or vomiting.

All patients are given 1/6 grain morphine sulphate and 1/150 grain scopolamine two hours before operation.

The proportions of nitrous oxide and oxygen vary in every case. The only rule is to give enough oxygen to keep the patient's color good.

In the total number of cases there were only two in which gas-oxygen could not be taken because of persistent cyanosis, and ether was substituted. In neither of these two instances was ether borne well.

The longest case, a tedious breast operation, lasted three and one-half hours, and when the patient regained consciousness she said she felt as though she had awakened from sleep.

Nausea and vomiting, when present after gas-oxygen, seem to depend on the operation, and not on the anesthetic. Curettage nearly always causes vomiting, and after gall-bladder operations nearly 50 per cent are nauseated.

Experience has demonstrated that the surgeon can, by delicacy in manipulation, materially diminish the number of cases in

which it is necessary to add ether to the nitrous oxide. A sharp pull with a retractor will cause the abdominal muscles to contract when steady pressure will not disturb.

The abdominal viscera must be handled gently if one is to obtain a quiet field for operation and avoid the use of ether. This will be readily understood when we remember that gas-oxygen produces a light anesthesia.

Nitrous oxide is much more difficult to administer than is ether.

It is no easier, possibly not so easy, for the surgeon to operate under nitrous oxide than it is to operate under ether, but to the patient the advantages of nitrous oxide over ether are distinct, and may be clearly evidenced by the following facts:

(1) That he loses consciousness in three or four breaths.

(2) That he has no strangling or choking.

(3) That he recovers consciousness immediately when the anesthetic is stopped.

(4) That he has little, usually no, nausea or vomiting.

(5) That he can take liquids much sooner after operation.

(6) That his ultimate recovery is shortened.

HEART-BLOCK FROM DRUGS OF THE DIGITALIS GROUP—THE COMPARATIVE EFFECTS OF DIGITALIS, STROPHANTHUS, SQUILL, AND APOCYNUM.

WINDLE reports a case of this nature in *Heart*, vol. iii, No. 1, 1911, and concludes as follows:

1. A case of rheumatic mitral disease is described in which various degrees of heart-block resulted from the administration of digitalis, strophanthus, and squill, respectively, during attacks of heart failure with dropsy. Marked improvement in the patient's condition was manifest under the full influence of each drug. The administration of apocynum had no effect on the conduction of impulses.

2. A notable feature in the records, taken before these drugs were given and after their effects had passed off, was the absence of impaired conductivity as evidenced by the duration of the intersystolic interval.

3. It has generally been thought that drugs of the digitalis group as a rule only depress conductivity, when this function is primarily impaired, as evidenced by a lengthened *a-c* interval. The present case suggests that an actual or potential impairment of conductivity may exist with a normal intersystolic period; the facts of another case incidentally referred to lend support to this view.

4. In some of the records absence of ventricular response to the corresponding auricular impulse is shown, though the stimulus is apparently conducted at the normal rate in the beats immediately preceding.

5. In some of the figures an extra wave succeeds the blocked auricular impulse; this wave is ascribed to the opening of the auriculoventricular valves by the contraction of the auricle, and their subsequent closure from back flow of the inrushing blood.

THE TREATMENT OF DIABETES MELLITUS.

SPRIGGS in the *Lancet* of October 28, 1911, gives these directions as to the treatment of this disease:

Having found out how much sugar is being passed out on the average from an estimation, if possible, on three separate days, proceed to restrict the carbohydrates in the food. The restriction of carbohydrate has two good effects: First, it lessens the amount of sugar in the blood, and abolishes, except in the most severe cases, the symptoms due to an excess of sugar in the blood and in the urine; secondly, doubtless again through lessening the sugar in the body fluids, the power of the tissues to burn carbohydrate becomes restored. The second effect is of fundamental importance. One may easily relieve the patient's symptoms in most cases by restricting his diet somewhat, but we must go further than this and find out what his assimilative power for carbohydrate is, and how much it can

be improved. This investigation involves a certain amount of arithmetic and requires the active coöperation of the patient. The procedure will differ somewhat according as diaceturia is present or absent.

If the diacetic acid reaction is absent, and if the urine rapidly becomes alkaline under the influence of bicarbonate of soda, the restriction may be made without fear of causing acid poisoning. Even in such cases, however, the author does not advise putting the patient upon a strict diet at once. For by putting a patient upon a strict diet one can induce a diaceturia which has not previously been present, and this is undesirable, even if the sugar entirely disappears. The diabetic, to begin with, cannot oxidize sugar properly; the appearance of the diacetic reaction means that another foodstuff, fat, is also no longer freely oxidized. Whilst, therefore, acknowledging that a large number of glycosuric patients can be put on a strict diabetic diet with impunity, the author advises not to do it. One can produce the same good result by going a little more carefully without the same risk of disadvantage.

There is another reason why it is not advisable to order a strict diet at once, and that is that many patients will find the sudden change so irksome that they will not carry it out properly. The instructions are far more likely to be obeyed throughout if they are reasonably lenient at first. Some patients are but little inconvenienced by the diet prescribed, others need great self-control to adhere to it. One must recognize this, and show sympathy by not asking too much. For the same reason, always allow as much bread as possible, for that is the food which is missed the most.

The following tables may help in drawing up a diet. They are compiled from the modern analyses of Atwater and Bryant, and the foods are arranged in three lists. The first list includes foods which are free from carbohydrate or contain less than one per cent. In the second list the foods contain a small proportion of carbohydrate, much of it in some of them being in the form of cellulose, which is not absorbed. The third list contains articles of diet which are richer in starch or sugar, arranged according to the amount which they contain.

All patients are allowed to eat freely from the foods in List 1, most patients may also take the foods in List 2, whilst those in List 3 are only allowed when specially prescribed in measured quantities.

LIST 1.—*Foods Free from Carbohydrate or Containing Less than 1 per cent.*

Beef.	Turtle.	Gelatin.
Mutton.	Lobster.	Starch-free breads.
Lamb.	Eggs.	" biscuits and cakes.
Pork.	Butter.	" flour.
Poultry.	Cheshire cheese.	Sugar-free jellies.
Game.	American "	" marmalade.
Sweetbread.	Dutch "	" jams.
Tongue.	Gorgonzola "	
Fish.	Lard.	

LIST 2.—*Foods Containing a Low Proportion of Carbohydrate.*

The figures indicate the percentage of carbohydrate.

Liver	1	Lettuce	3	Mixed pickles	4
Sausage (pork)	1	Spinach	3	Cauliflower	5
Crabs	1	Oysters	4	Cabbage	6
Crayfish	1	Mussels	4	Leeks	6
Scallops	3	Stilton cheese	3	Radishes	6
Asparagus	3	Cheddar "	4	Mushrooms	7
Celery	3	Rhubarb	4	Watermelons	7
Cucumbers	3	Tomatoes	4	Brazil nuts	

LIST 3.—*Foods Rich in Carbohydrate.*

Milk	5	Artichokes	17	Bread (rolls)	56
" skimmed	5	Peas (green)	17	Lentils (dried)	60
Whey	5	Cherries	17	Bread (toasted)	61
Oatmeal (thin gruel)	6	Almonds	17	Peas (dried)	62
Strawberries	7	Potatoes	18	Gingerbread	63
Turnips	8	" with cream	18	Macaroons	65
Carrots	9	Dried pears	18	Sponge cake	66
Beet (fresh)	10	Figs (fresh)	19	Oatmeal	67
Onions (fresh)	10	Grapes	19	Chestnuts (dried)	74
Cranberries	10	Plums	20	Sago	78
Pineapple	10	Potatoes (boiled)	21	Tapioca	88
Oatmeal (boiled)	11	Bananas	22	Arrowroot	97
Blackberries	11	Rice (boiled)	24	Dried fruits—	
Dried peaches	11	Tapioca pudding	28	Apples, Apricots, Currants, Dates, Figs, Prunes, Raisins	62 to 78
Oranges	12	Cocoanuts	28		
Parsnips	13	Chocolate	30		
Apricots	13	Mince pie	38		
Currants	13	Chestnuts (fresh)	42		
Walnuts	13				
Filberts	13				
Apples	14	Apple pie	43	Meal	70
Pears	14	Bread (brown)	47	Flours	to
Macaroni (cooked)	16	Potatoes (fried chips)	47	Rice	80
Calf's-foot jelly	17	Bread (white)	53	Macaroni, Vermicelli	

INTRATRACHEAL INSUFFLATION AS AN ANESTHETIC METHOD.

QUINBY in the *Boston Medical and Surgical Journal* of October 19, 1911, reminds us that within the past year Dr. Elsberg, of New York, has reported the successful administration of ether by this method in something over 100 cases. In Boston, Ehrenfried and Boothby as well as Quinby have used it. Upward of 150 cases in all, supposedly, have been subjected to anesthesia by the intratracheal route, and with no untoward result. There has been no pneumonia caused by it.

The first and most important advantage

of this intratracheal insufflation is found in its use during surgical operations which open the chest cavity, for in contradistinction to all other methods yet used, this is the only one in which proper oxygenation of the blood is performed independently of any respiratory effort on the part of the patient. With it the usual type of external respiration is converted into the internal type. In all the positive and negative pressure contrivances, expiration takes place at a disadvantage, the barometric pressure which exists on the surface of the exposed lung being less than that within the air spaces. This throws an increased amount of work on the right heart, which must compensate. Besides this, there is a tendensy for carbon dioxide to remain too long in the alveolar spaces to the exclusion of the better oxygenated air. In the course of a long operation this has a definite poisoning effect on the heart wall. Both these undesirable effects are avoided by the insufflation method.

Furthermore, the much-decreased number of respiratory movements makes operations within the depths of the thorax much easier than they would be otherwise. Another advantage is that the gullet is left free for instrumentation. This important point was illustrated very well in a case which the author etherized by the intratracheal method for Dr. Scudder. The patient suffered from a rupture of the diaphragm, the left thorax containing the whole stomach, a piece of the transverse colon, and a portion of the great omentum. During the operation it became necessary to empty the stomach of a quantity of fluid which it was found to contain, so that it might be made small enough to pass back through the rent in the diaphragm. Without inconveniencing the smooth course of the anesthesia in the least, a stomach tube was passed. The patient made a perfect convalescence.

Still another advantage of the intratracheal method is the very complete aeration produced. Patients recover from the anesthetic very quickly as a consequence of this.

Then, too, though it does not apply to anesthesia as such, the author states he cannot forbear to mention the great importance of the insufflation method, using plain air or oxygen, for cases of cessation of respiration from any cause. The lives of patients suffering from brain abscess and morphine poisoning have already been saved by it. It is the best method which will "breathe for the patient." Dr. Meltzer has had even this experience. He has given a dog four times the lethal dose of strychnine, then prevented the convulsions by the injection of curare, and by means of the intratracheal insufflation of air kept up a good ventilation till both the strychnine and the curare were excreted and the animal recovered.

In regard to the clinical application of anesthesia by this method, there is little to add to the directions given in the previous paper of the author in November. The air should be warmed and moistened before it reaches the bifurcation of the trachea. It must also contain ether in varying amounts. Any apparatus which will fulfil these requisites and is simple is quite adequate. The apparatus which he has had made for him by Codman & Shurtleff has thus far been entirely satisfactory.

The tracheal tubes are of soft rubber, with perfectly smooth surface free from seams, about fifteen inches long, with finished ends like stomach tubes. Their walls are of a uniform thickness of 1 mm., and for convenience in judging the length of tube which one is using they should be marked in centimeters from 15 to 30.

Before introduction, the size of the trachea above the sternal notch should be estimated and a tube chosen which is about half this size, or a little larger. After a hypodermic of morphine and atropine, the patient should be etherized in the usual way. Then under full surgical anesthesia, with the patient in the Rose position, the mouth gag is inserted, and the sterile tracheal tube introduced, either by a laryngeal forceps, the epiglottis being held forward by the operator's left forefinger, or by the use of a Killian speculum. Previous painting of the pharynx and larynx with cocaine he has found to be unnecessary. After passing the glottis, the tube is pushed for-

ward till a resistance is felt, or until 26 centimeters have been introduced (in male adults), as measured against the upper incisors. It should then be withdrawn about one centimeter so as to lie just above the bifurcation, and then connected with the rest of the apparatus. When it is correctly placed, air can be heard to enter both lungs on auscultation.

It is the writer's hope that many surgeons will become familiar with the principles underlying this method, as it is one of undoubted value and promises to be of great aid in the future of thoracic surgery.

CAUSE AND RELIEF OF PAIN IN DUODENAL ULCER.

PILCHER (*Long Island Medical Journal*, vol. v, No. 9) holds that after the food has left the stomach entirely there is still an outpouring of hydrochloric acid, and in cases of duodenal ulcer this would seem to be greater in amount and concentration than is ordinarily the case. Hence it would seem plausible that the pain of duodenal ulcer, that which comes on several hours after meals and is caused by irritation, is due to hydrochloric acid. The most plausible explanation for the control of pain after the ingestion of food would be that this secretion was in some manner neutralized. To determine the neutralizing agent certain animal experiments were carried on, by virtue of which no extraneous secretion could enter the duodenum while the secretion of the duodenum proper was prevented from escaping into the intestine below. By a duodenostomy the recovery of the pure duodenal secretion was provided for.

In every instance the postoperative course was uneventful until between the fiftieth and sixtieth hours, when all the dogs died a physiological death, due to the exclusion of the duodenal secretion from the remainder of the intestinal canal.

As a result of the experiments the author concludes that the cause of pain in duodenal ulcer is the hydrochloric acid contained in the gastric juice coming in contact with the ulcerated surface after it has passed into the duodenum. This conclusion is based on the following observations: (1) Ulcer of the duodenum reflexly excites a hyperacidity of the gastric juice; (2) the maximum amount of secretion of hydrochloric acid in the stomach is due to a direct chemical action and is at its height from one to four hours after meals; (3) it passes into the duodenum as hydrochloric acid, there being no food for four hours after meals for it to work upon; and (4) it does not excite a flow of the duodenal juice directly, and is not neutralized by the small amount present.

The relief of pain in duodenal ulcer follows the ingestion of any substance into the stomach, and is due to a reflex stimulation of the duodenal secretion which neutralizes the acid gastric juice. This conclusion is based on the following facts, already demonstrated by experiments: (1) Food taken into the stomach excites at once a reflex secretion in the duodenum; (2) the duodenal secretion is alkaline in approximately the same degree as the gastric juice is acid; and (3) this secretion is of sufficient quantity and concentration to neutralize the hydrochloric acid of the gastric juice.

Pilcher (P. M.), writing on this topic, observes that the general picture which is presented by a chronic duodenal ulcer is strongly suggestive of its presence, and the indications offered by it for surgical intervention should be taken in the aggregate. When the attacks occur more frequently and are of longer duration, when the periods of relief following the ingestion of food or alkalies are of shorter duration, then surgical aid must be considered. At least ninety per cent of such cases, if treated by a competent surgeon, can be assured of positive relief after the placing of a properly executed gastrojejunostomy.

Bleeding occurs in about one-third of the cases, at least in quantities sufficient to call the attention of a patient to it. It is seldom fatal, but may prove so at any time, and we have no direct or indirect control over it other than by operative procedure.

It is interesting to note that in many instances subsequent to a hemorrhage the attack has temporarily disappeared or become much less severe.

Stenosis is easily demonstrated, if it has reached any extensive degree, by giving the patient raisins and rice to eat the night before the test meal is extracted. If the raisins are recovered the next morning, there is certainly pyloric obstruction.

An absolute indication for operative interference is based on the finding of an epigastric tumor, usually situated to the right of the median line about one inch below the free border of the ribs; this has been present in 15 of the 176 cases observed.

It is seldom possible to excise the ulcer. If it should be small and easily reached such a procedure is ideal, the resulting orifice being sutured in the opposite direction from its long axis. In such a case if the diseased tissue has been entirely eradicated and the lumen of the duodenum unimpinged upon, an accompanying gastrojejunostomy is unnecessary and unwise. The ulcer should in every instance, unless the degree of induration is prohibitive, be enfolded, accomplished best by mattress sutures. They may be introduced with the base in either direction, the loop including the entering vessels. There should in any case result from this procedure a moderate but not necessarily absolute occlusion of the lumen of the duodenum.

If the ulcer runs up to or involves the pyloric ring, its excision with a pyloroplasty, after the method of Finney, can in some cases be accomplished without gastroenterostomy.

If, however, as in the majority of cases, it is found necessary to make a stoma between the stomach and intestine, the jejunum should be pulled up as short as possible and attached to the posterior wall of the stomach, the nearer the pylorus and the greater curvature the better.

The incision should be from above downward, and from the right to the left, forming an angle of forty-five degrees with the vertical axis of the stomach. It is well to introduce at the upper border of the intestine two retaining sutures, one at either end of the anastomosis, in order to prevent sagging and kinking, as it is very probable that some of the ulcers occurring in the duodenum are consequent to a kinking at the duodenojejunal angle, as has been pointed out so clearly by Lane. The rent made in the gastrocolic omentum should be sutured up to the edges of the anastomosis in order to prevent hernia upward into the lesser peritoneal cavity of the intestines.

If possible, as a final step, a tab of the omentum should be sutured over the enfolded ulcer. This is particularly desirable if it has been found impossible to invaginate the ulcer.

The patient will do better if he is immediately placed in a semiupright position after recovery from the anesthetic.

NUCLEIN AS A SURGICAL DRESSING.

REDFIELD (*New York Medical Journal,* Oct. 14, 1911), after quoting Vaughan's studies on the effect of nuclein on the multinuclear white cells of the blood and a rather extensive and on the whole promising clinical experience, decided to try the effect of the nuclein solution as a local dressing for certain infected wounds. The first case thus treated was that of a printer, who had fed his index and second finger into the press, which produced severe crushing of the first phalanx. The wound was washed slightly and dressed with sterile gauze soaked in nuclein solution full strength. Five days later, the dressing having been kept soaked with nuclein solution, the wound was completely healed. A number of striking cases are quoted, on the basis of which the author invariably uses a nuclein dressing when he expects trouble from infected wounds.

ABDOMINAL LIPECTOMY.

Under this alluring title SHALLENBERGER (*Johns Hopkins Hospital Bulletin,* November, 1911) reports two cases. In each instance, because of a fat, flabby, pendulous

belly, a slab of skin and fat was removed, in one case weighing a trifle over seven pounds, and in the other measuring 38 centimeters in length by 12 in width, weight not given. Maylord is given the credit of having removed 10 pounds.

The advantages of the operation are thus described by Kelly:

The removal of a slab of fat and a decrease in weight; great addition to personal comfort generally; convenience and comfort in dressing; better pose in standing and better poise in walking; increased activity; cleanliness greatly facilitated; figure changed from unsightly and awkward to one much more natural; the sensitive patient occupying afterward a more normal and natural relation to society.

INFANTILE PARALYSIS.

TAYLOR (*American Journal of Surgery*, November, 1911) notes a great increase in the number of cases of this disease. Although the mortality is small the percentage of resulting paralysis is close to 90, as few cases recover absolutely. Attention has been called to the greater number of cases seen in those localities where immigration has occurred from Scandinavia. Anderson's report shows that the cases as a rule have been in unusually healthy children, as has been most often the case in the author's experience, the strongest child in the family being the one often most seriously afflicted. Anderson believes that the disease has undoubtedly been carried from case to case, and in certain instances by a third person. Flexner, however, has not been able to demonstrate the spontaneous transfer of this disease from infected to healthy monkeys by contact, although these animals are very susceptible to it by direct inoculation. He, however, very distinctly states that this fact does not militate against the notion of contagion in respect to the spontaneous disease in man, as monkeys are not naturally susceptible to this disease unless artificially implanted.

Flexner and Lewis have further shown that the infectious agent is an extremely minute microörganism. It is ultramicroscopic. Attempts to implant the disease on domestic animals and rats have failed. Flexner thinks, however, that the paralysis seen in poultry, the dog and horse are due to a cause peculiar to the species infected. This is interesting from the fact that in the epidemic in Michigan, in 1907, Griffin reported that many pigs and chickens were also affected. Krause reports an epidemic in which together with the involvement of the humans there was a coincident great mortality among chickens. Taylor was told by a colleague of having heard of two children who had eaten chicken and a dog which had eaten the bones, and all three were paralyzed shortly after. Flexner is inclined to believe that the virus gains access to the cerebrospinal axis by means of the nasal mucous membranes and lymphatics through the cribriform plate of the ethmoid. He also thinks it is eliminated by it. Intraperitoneal injection of monkeys with spinal cord material from a child who died of paralysis reproduced the disease, but the cord from such infected monkeys would not produce the disease when introduced intraperitoneally in monkeys. If peristalsis is minimized by opium and comparatively large quantities of the virus introduced into the stomach and intestines it will reproduce the disease. Taylor's experience has shown that gastroenteric symptoms so preponderate at the onset in cases observed by him that it seemed suggestive that the systemic infection started there. In the human subject there are seldom symptoms suggestive of a coryza at the onset or decline. At the onset 3.1 per cent had throat and nose symptoms. Microscopically the lesions were found in the brain and cord, but more markedly in the latter than in the former, and in the gray matter of the cord more than in the white matter. Mononuclear infiltration forming collars around the blood-vessels preponderated. That the cervical and lumbar enlargements have an abundant arterial blood supply accounts for the greater severity of the lesions at these points.

In contrast to cerebrospinal meningitis, which is a disease of winter and early spring, anterior poliomyelitis is essentially a disease of summer and early fall, and is especially noted during a hot spell. As a rule dry summers seem to have a tendency to lead to more cases than wet ones.

Premonitory symptoms are very probably due to leptomeningeal irritation. They are usually present one to three days before the acute symptoms begin. They consist of more or less rigidity of the spine and neck, and Kernig's sign with unequal rigidity in the two legs. At this time the knee reflex may be increased, only to disappear entirely after the acute stage is reached. Sometimes there is a slight weakness in one or both legs.

Acute symptoms appear in from four to fourteen days after exposure in the epidemic form, but in the majority of the so-called sporadic cases seen it is next to impossible to trace the source of infection and period of incubation. The symptoms divide themselves into cerebral, bulbar, spinal, and neuritic types, depending upon the region chiefly involved. In the cerebral form convulsions, delirium, and drowsiness are present, but this type is rare. In the bulbar form we see the respiratory distress, and 75 per cent of these constitute the rapidly fatal cases of this disease.

The onset begins with slight fever (99° to 101° F.) the first day, with flushed face, intense headache, backache, and increased unilateral Kernig's sign.

Except in the mildest cases, the fever on the second day is highest, but rarely goes to 105°, usually not being over 102°. The pulse ranges from 120 to 140, but is generally of good tone and well sustained, except in the bulbar type.

Spasticity in the neck, spine, and legs is more marked the second day. Tremors and clonic movements may be present, but sleep is quiet, as there is more or less drowsiness. Nausea and vomiting may be the first symptoms noted and lead one to think the trouble is primarily gastroenteric, but these symptoms may be central in origin.

Constipation of the bowels is invariable, and of very nearly as great frequency one finds retention of urine, so that catheterization may have to be resorted to, though this is rarely necessary.

On the third day the fever abates, and on that day or the day following the paralysis appears, converting the previously rather spastic limb into a flaccid one. With the subsidence of the fever there may be some sweating. The headache and backache disappear, but with the paralysis the hyperesthesia begins, if the case is of the neuritic variety.

A severe general paralysis at the onset may clear up in a few days, weeks, or months, leaving paralyzed only those muscles that receive innervation from the necrosed segments of cord. Paralysis of the legs is much more common than in the arms. The most frequent permanent leg paralysis is seen in the extensors of the toes and tibialis anticus.

Next in frequency is the quadriceps extensor of the leg, and often associated with it is paralysis of the adductors.

At times the psoas and iliacus are also involved, but usually only in conjunction with the other lower leg muscles.

Of the hamstrings the biceps escapes most often, and the sartorius of the anterior thigh group is equally fortunate. The calf muscles and flexors of the toes are not nearly so frequently involved as are the anterior group.

As a rule, if a paraplegia exists there is frequently entire dissimilarity on the two sides. Often one side will clear up in six to twelve months.

Of the contracture deformities seen, flexion and outward rotation of the thigh and flexion of the knee are more common than the reverse, owing to the greater frequency of paralysis in the antagonistic groups, although Sever, at the Children's Hospital, Boston, finds adductor paralysis less frequently than does the author.

Of the foot deformities in their order of frequency may be named in the writer's experience talipes equinus, talipes valgus or paralytic flatfoot, talipes equino-varus,

talipes cavus, and talipes calcaneus. Similarly in the arm the distribution of the paralysis is asymmetrical, depending on the necrosis in the segments involved, but the deltoid, supra- and infra-spinatus, triceps, biceps, supinators, extensors of the fingers, thenar and hypothenar groups suffer, in the order named, most frequently.

Atrophy becomes marked in from one to six months after the fever and may be extreme. This atrophy involves not only circumferential measurements of the limb, but the bones are also affected in length and circumference. The latter is shown by the *x*-ray. Delayed use of the limb in neglected cases in which braces or operative treatment have not been employed in young children leads to the most extreme degree of shortening seen, amounting to three or four inches or more.

Kernig's sign of an asymmetrical type, constipation, retention of urine, spasticity of spine and neck, fever of short duration with subsequent flaccid paralysis, render diagnosis simple, but it may be confused with (1) autointoxication with vomiting and constipation, (2) rheumatism, (3) typhoid fever, (4) la grippe, and (5) cerebrospinal meningitis. The first four should not present any serious difficulties, and lumbar puncture would clear up the diagnosis in the last. The presence of brief fever, unilateral Kernig's sign, and flaccid paralysis should render diagnosis obscure for only a day or two.

In addition to the early symptoms named, Flexner has shown that the cerebrospinal fluid obtained by lumbar puncture shows characteristic changes in the acute stages which are of diagnostic value. There may be a slight increase in the amount and pressure of the fluid during the incubation period with progressive increase in the cellular elements, especially the lymphocytes, so that at the height of the disease the fluid previously clear becomes opalescent and undergoes a spontaneous coagulation from excess of protein. As the disease abates it reassumes its normal clearness and non-coagulability. The opalescent fluid is potent in reproducing the disease, while the clear cerebrospinal fluid is not.

As to treatment, there is no question but that it is the duty of all State boards of health to insist upon the immediate reporting of all cases of infantile paralysis. Isolation is the first duty. Elimination is accomplished by broken doses of calomel and soda, followed by one or more doses of castor oil. Enemata are also employed. Hot wet packs are indicated for the skin, and also hot baths. Free drinking of water is encouraged. Cold compresses or ice-caps should be kept on the head; counter-irritation over the lumbar spine and sponging for high fever. Lumbar puncture is often of value, not only for diagnosis but relief of pressure symptoms, especially in bulbar symptoms of respiratory failure, such as cyanosis, shortness of breath, pallor, and anxious facies. Massage should be begun on the subsidence of fever and intense pain, supplemented by electricity, preferably the slowly interrupted faradic current applied over the origin of the weakened muscles, to stimulate not only the circulation and nutrition, but to obtain any slight remaining power of contraction. Antagonistic muscles must be well stretched to prevent contraction and thereby give the weakened muscles a chance to regain their tone. If this is done at the start and persisted in, no contractures should occur which will require tenotomy or myotomy later. Passive movements, assisted active movements, and resisted active movements in turn also help materially.

After the acute stage the child should lie flat on the back with the limbs held straight —not in positions likely to produce contractures. As soon as the acute symptoms subside, if the child cannot bear weight on one or both limbs without producing distortion, proper braces and shoes must be designed and prescribed by the surgeon to meet the requirements of the individual case. The child should be gotten on its feet as soon as possible.

Operative procedures may be divided into tenotomy and myotomy, tendon transplantation, muscle transplantation, tendon shortening or tendon lengthening, arthrodesis, tenodesis, astragalectomy, osteotomy, and nerve anastomosis or grafting. Teno-

tomy and myotomy are of distinct benefit in that they not only restore the normal alignment in the members, but relieve the remaining weakened living muscular fibers in the paretic muscle from overstrain, which in itself is a detriment. As a rule, some mechanical device to prevent recontracture of the overstrong muscle is required. Frequently tenotomy, myotomy, or even osteotomy is required as a preliminary operation to correct distortion some months prior to a secondary operation of tendon or muscle transference, the latter aiming chiefly to restore the balance of power and physiological function.

Tendon transplantation to tendon has not yielded the results at first hoped for. Tendon transplantation to periosteum has been more successful. The important point is that the transplanted tendon or muscle must pull in a straight line and not around a corner. In operating about the ankle the transplanted tendon should be passed under one of the thecal compartments of the annular ligament in line with the new and desired direction of traction.

Taylor thus describes his technique: After the circulation has been shut off by the Esmarch bloodless bandage and tourniquet in the usual manner, four small incisions are made as follows: First, at the insertion of the overactive muscle, which is severed as low down as possible; secondly, over that portion of the same muscle where the muscular fibers first become tendinous —through this wound the freed tendon is withdrawn and the whole covered with a wet, normal salt solution sponge to prevent drying of the tissues; thirdly, at the proposed insertion down to the periosteum; and fourthly, over the annular ligament.

Lange's curved tendon forceps or a hemostat is passed from the annular ligament wound through the subcutaneous fat to the belly of the muscle, where the freed distal end of the tendon is passed and drawn down to the annular ligament. A very small hemostat, after the exact direction desired is determined, is passed under the annular ligament through an appropriate compartment and the end grasped and drawn through. If the tendon will not reach to the desired insertion, one or more strands of black braided silk are quilted into the end of the tendon, and these are pulled from the bottom of the annular ligament subcutaneously to the desired point of insertion, where they are firmly sewed to the periosteum, which may be incised or not, as the operator deems best and the conditions demand. Lange first pointed out that these silk strands offered a framework for the tendinous tissue to grow about and between. Of course, if the transferred tendon is long enough it may be sewed directly to the periosteum.

Withdrawing the tendon from its sheath —*i.e.*, from "incision one" to "incision two," and ultimately disregarding the old sheath—does not appear to affect the nutrition nor ultimate function of the transferred tendon in the slightest degree. It is possible to imagine a new sheath is regenerated from the subcutaneous and adipose tissues.

The writer has used repeatedly Lange's heavy braided white silk embedded in paraffin, after boiling in 1:5000 bichloride, but finds in practice that the ordinary black No. 5 braided silk, boiled five minutes in the sterilizer, is all that is necessary. The wounds are closed tightly with the subcuticular continuous silver-wire suture and then covered with silver foil, the usual dressing, and plaster cast. The stitches are removed on the tenth day, but the cast is continued six weeks. The tourniquet is not removed until the plaster dressing is completed.

It is needless to say that the foot or part is put up in overcorrection to overcome the deformity and relieve tension on the transplanted tendon. Massage, passive and then active, then resistive movements, together with slowly interrupted faradic stimulation, form important adjuncts to the after-treatment of these cases.

Muscle transplantation is commended by Taylor, particularly in transplanting the biceps into the region of the tibial tubercle rather than attempting to use the sartorius as an extensor of the knee.

Arthrodesis should not be done in children under ten since the bones are too cartilaginous to yield good results and prevent a return of motion. Osteotomy is employed only when malpositions can be corrected by no other means. Functional use, and especially weight-bearing, should be most cautiously employed after all of these procedures, when by means of massage, electricity, baking, passive motions, and the like the parts have been prepared and the muscles strengthened to bear the strain. Six months is a much better limit and will yield much better results than the usual six weeks' interval given after the operation.

Neuroplasty has in Taylor's experience given unsatisfactory results. He believes that with more or less impairment of all the nerves in the paralyzed extremity regeneration from a supposed good nerve by suturing into a paralyzed one is a very slight gain. It is like taxing an already weak and run-down battery with new connections and more work.

The state of the operative treatment today is that the tendon transference direct to a new periosteal insertion or by means of silk lengthening sutures gives the most brilliant results, and in many instances may permit the patient a close approximation to normal physiological use without braces.

THE MANIPULATIVE TREATMENT OF CONGENITAL DISLOCATION OF THE HIP-JOINT.

SIMPSON (*Lancet*, Oct. 21, 1911) states that in a large proportion of cases treated by simple manipulation before the age of nine, a true anatomical reduction with full restoration of function is to be expected. In most of the remainder the head of the femur is moved forward from its unstable position on the dorsum ilii to a position either close to and above, or anterior to, the site of the true acetabulum. In this position the head is fixed by strong ligaments and muscles which pass over it, and a stable and mobile articulation is obtained, so rectifying the limp. The new articulation is close to the normal plane of gravity and so eliminates the lordosis.

In a few of the apparent anatomical reductions there is a well-formed acetabulum and a good joint, but the radiographs show that the acetabulum lies a little above its usual position, and is formed chiefly by the ilium. Physical examination of the patient shows that the trochanter is slightly raised and the head of the femur lies at a higher position than usual and can be more readily detected from the groin. The functional result in these cases is exceedingly good, often making a limb practically equal to a normal one. Such cases should be classified as true repositions, in which the aberrant level of the acetabulum is developed to suit the malformed and malplaced head of the femur.

In the class of anterior repositions the head is placed more forward in the groin and held apparently by ligamentous structures, no definite acetabulum being usually formed. The results in these cases are functionally but little inferior to those of true repositions. In a very few cases there is a good false acetabulum formed in this position.

In the few remaining cases the dislocation remains of the dorsal type; a fresh attempt may be made, aided if need be by open operation; even, however, should this course not be taken the condition of the patient is generally improved. In some cases a true false joint is obtained close to, but behind, the true acetabulum, and if this be the case the results may be excellent; possibly this results from rupture of the capsule during treatment. In other cases there is, as a general rule, a more stable limb with less limp and less lordosis than in untreated patients.

The cases recorded were treated at the Royal Southern Hospital between 1901 and 1909: some of the earliest by prolonged extension and abduction in a Thomas frame, others by this method followed by the Lorenz method. Since 1903, when Lorenz gave a demonstration at the hospital, his method of treatment has been followed with but slight modification. In bilateral

cases both limbs are reduced at one operation, unless prolonged manipulation is required by reason of age or other difficulty. The plasters are usually closely molded over a tight-fitting woolen garment, with small pads of wool over the sacrum and iliac spines. If much padding be used the limb may get redisplaced. The patients are allowed to leave hospital within a week after operation, and the parents are told to encourage them to use their limbs. This is facilitated if a strong toy horse or a low chair mounted on wheels be provided, on which they can sit astride and propel themselves while still in plaster. The functional use seems to aid in keeping the joint intact and also in molding and deepening the acetabulum, as Lorenz has pointed out. Every six or eight weeks (longer intervals, three to six months, were used at first) the plaster is reapplied, the limb being—under an anesthetic, if necessary—brought down to a more normal position and at the same time inverted, care being taken not to allow a redislocation. In from seven to twelve months the fully extended normal position is attained, and after a further six to eight weeks in plaster in this position a Thomas caliper splint is fitted, and the child wears this for about six months longer, to keep the joint firm while it is first used. Massage and passive movement at this time greatly improve the functional result. In applying the new plasters care is taken to overcome the torsion of the limb and so bring the foot into good position and line; by this means some of the advantages of Lovett's inverted position seem to be gained. In none of the present cases, however, has that method been used, though it is now being tried in some cases.

The 33 cases reported include 40 joints—the treatment two to twelve years. A few are still wearing their calipers; others have been free from treatment for five or six years.

There were 21 perfect anatomical reductions, 9 stable anterior repositions, and 10 dorsal dislocations, giving 72 per cent of very good results, and ten per cent of poor results. If five cases which were over nine years old at the time of reduction be excluded, the results were good in 89 per cent of the cases and fair in 11 per cent.

THE OPERATIVE TREATMENT OF BADLY UNITED FRACTURES.

LANE (*Lancet,* Nov. 4, 1911) states that perhaps no operation in surgery makes a greater demand on the skill, resources, and ingenuity of the surgeon than that requisite to restore a badly united, useless bone to its normal form and functions. If an operation is resorted to at the time the injury is sustained the difficulties which the operator has to meet are relatively small, however great the comminution, since the fragments can be fitted accurately together and retained in position by plates and screws, if only the surgeon has enough patience and experience.

The chief obstacle that has to be overcome in many cases is the approximation of the edges of the skin incision and their retention in accurate apposition. This difficulty is experienced more commonly in fractures about or above the ankle-joint, but it may be met with in many fractures where there is much laceration of the soft parts, and especially when some time has been permitted to elapse since the receipt of the injury and the tissues have become inflamed. The earlier the operation is performed after the receipt of the injury the easier it is to carry it out effectually and rapidly. Michel's clips form the most effectual means Lane knows of for retaining the skin edges in accurate and efficient apposition. If accurate apposition is not established the wound may become fouled and the plates may come out. Such an accident means disaster to the patient. At the best it entails delayed union and probably some necrosis. In consequence of the softening of the bone in order to eliminate the screws, non-union of fragments is likely to occur. Again, such non-union is difficult to deal with by operative means, since the organisms which get into the wound lie quiescent for a very long time in and about the bone, and only become active

when a plate and screws are introduced. The length of time these organisms will remain quiescent is remarkable and most disappointing to the surgeon who attempts to deal with a case that has once been fouled.

Surgeons are learning by painful experience that they cannot fix fragments in fractures by foreign bodies with the casual amount of asepsis they find sufficient for abdominal and other operations. Personally Lane believes that for some time the results that will be obtained by operation on simple fractures will at least be as hopelessly unsatisfactory as are those following non-operative treatment. Indeed, some surgeons seem to regard as normal the necessary removal of screws and plates by a process of suppuration, and are inclined to consider the infection as resulting from the presence of organisms in the blood rather than from their own insufficient precautions. The trouble will be gradually eliminated by increased experience.

EXTENSIVE REMOVAL OF THE INTESTINE.

WHITALL (*Annals of Surgery,* November, 1911) reports the case of a woman who after a sepsis consequent on labor complained of a severe pain in the left side. Thereafter there was a miscarriage, for which she was curetted. Portions of the placenta which lay immediately over the os and a portion of a macerated four months' fetus were removed. During the course of this the operator pulled down some bowel, the operation then having lasted for two hours. Section was at once performed by Whitall, which showed that the gut which had been pulled into the uterus was entirely torn loose from its mesentery. All the intestine thus deprived was resected, both ends were ligated, the stumps were touched with carbolic acid first, then alcohol, and the ends invaginated with a purse-string suture. A lateral enteroenterostomy was then done. The whole uterus was closed with a mattress suture.

The time of operation was one and a half hours, making a total of 3½ hours under ether. The gut removed was measured and found to be 10 feet 8 inches long. Convalescence was uneventful, excepting for phlebitis of the right femoral vein. At the time of the report no nutritional disturbances had developed.

CIRRHOSIS OF THE STOMACH.

LYLE (*Annals of Surgery,* November, 1911) states that the term linitis plastica was used by Brinton to designate a special disease of the stomach, benign in nature, characterized pathologically by a diffuse or circumscribed increase in the connective tissue involving chiefly the submucosa, and to a less degree the other layers, giving rise to a marked thickening of the stomach walls with a corresponding diminution in its lumen; clinically by its insidious onset, its slow progressive gastric symptoms, its cachexia, and fatal termination. As to its etiology, it is held that this is a special affection of indefinite nature and cause, or that it is a scirrhous cancer. Two forms are recognized, local and the general. In the localized form are found indurated plaques on different portions of the viscus. The more common variety is the one which is found in the pyloric region, forming a plaque of varying extent, often encircling and stenosing the pylorus. In the generalized form the stomach may be normal in size, dilated, or contracted. Contraction is the rule, dilatation the exception. In a typical case there is found a shrunken, thick-walled tube lying transversely across the epigastrium, suggesting by its size a segment of the large intestine. Often the walls of such a case are so rigid that if the stomach be removed it does not collapse but maintains its original shape. The peculiar dull-grayish color of the peritoneum gives to the surface of the stomach a scarred-looking appearance.

On section the stomach wall is greatly increased in thickness. It may be six to eight times as thick as the normal wall. Despite the infiltration the layers remain distinct.

In the advanced cases all the coats are involved, the most marked involvement being in the submucosa, subserosa, and serosa. According to Brinton, the submucosa is ten to twenty times its normal thickness, the serosa and subserosa seven to ten times, the muscularis five to eight times, and the mucosa two to three times. The mucosa is often normal in appearance.

It is a disease of adult life, more common in men than in women, and a considerable number of cases give a history of cardiac or arterial trouble. The symptoms are first those of indefinite dyspepsia, the formation of a transverse sausage-shaped tumor with a sense of resistance, decrease in free hydrochloric acid, and vomiting which finally becomes incessant. There is complaint of suffocating tightness in the epigastrium; this distressing symptom is partially relieved by vomiting. The stomach cannot be distended and will hold only small quantities of fluid.

The *x*-ray is often diagnostic, showing a small stomach of the infantile type drawn well up under the ribs. The disease unrelieved by surgical measures is fatal. The average duration is about four years. Diagnosis is rarely made during life. The operation of choice is gastrectomy; if this be impossible, gastroenterostomy; and if this be impracticable, jejunostomy. Cases have been described in which cure has been accomplished by simple exploratory laparotomy. Many of the cases reported are undoubtedly scirrhus.

A RARE INJURY TO THE PENIS.

MERKENS (*Deutsche Zeitschrift für Chirurgie,* Bd. 111, H. 1-3) reports that while a laborer was standing outside of an open shed door with the penis in the crack of the door for the purpose of urinating his right foot slipped so that the knee struck against the door, closing it, and in this manner catching the penis. He endeavored to free himself by pulling, but succeeded only on opening the door. Upon admission to the hospital the organ was flaccid and 20 centimeters in length. The peripheral half was swollen and bluish-red. There was complete retention of urine. An incision was made near the root of the organ in order to introduce a catheter. It was found that at the middle of the organ the corpora cavernosa and urethra were completely divided, only the skin holding, the cavity being filled with blood. An effort was made to preserve the peripheral portion, but after five days it had to be amputated on account of gangrene.

WHEN AND HOW TO OPERATIVELY TREAT VARICOCELE IN THE MALE.

HEINECK (*Providence Medical Journal,* September, 1911) notes that varicocele is commonest on the left side, and with some exceptions is rare at either extreme of life. When idiopathic, varicocele causes a sense of weight and a dragging pain in the scrotum and groin, relieved by lying down and increased by severe bodily strain. At times there are no subjective symptoms at all. The veins collapse when the patient assumes the horizontal posture. The symptomatic type is almost invariably painless, and the veins remain distended when the patient assumes the reclining posture.

The secondary or symptomatic type of varicocele may be caused: (1) By neoplasms of the kidney. In 16 cases of renal tumors, six had determined a symptomatic varicocele. Reclus's patient was an elderly man who presented a right-sided varicocele consecutive to a renal cancer. (2) By occlusion of the left renal or of either spermatic vein by a neoplastic growth, by any form of renal or postperitoneal tumor. (3) By kinking of the spermatic vein due to inflammatory adhesion or renal prolapse.

The explanations of the idiopathic varicocele are based on the length and the vertical course, the dependent position, and the great tortuosity and frequent anastomosis of the spermatic veins, together with the abnormal thinness of their walls, the absence of external support, and the pressure exerted by abdominal strain. The minor frequency of right-sided varicocele is due

to the almost constant presence of an efficient valve at the point where the right spermatic vein debouches into the inferior vena cava. Occasionally the valve of the left spermatic vein is absent. Among other causes that may be named as factors predisposing to varicocele or causing its development are those which tend to obstruct the free return of blood through the spermatic veins from the testis, as, for instance, fecal masses in the cecum or in the sigmoid colon, pressing upon the spermatic veins; undue activity of the sexual apparatus; occupation exposing the scrotum to frequent slight traumatisms, or such as requires prolonged standing; heredity, traumatism, previous inflammatory states. The great preponderance of left-sided varicocele is attributed to inferior muscular development of that side of the body, greater length of the vein, exposure to pressure by the loaded sigmoid or colon, rectangular implantation of the left spermatic vein into the left renal vein. The author notes that of twelve cases of primary varicocele of the broad ligament, six occurred upon the left side alone, and in six it was bilateral; in no case was the right side alone involved.

If every case of varicocele is operated on indiscriminately, a fair percentage of patients will suffer permanent bodily harm, locally in the testis and generally in body and mind. Operative intervention is absolutely contraindicated in pseudovaricocele. In symptomatic varicocele the cure is dependent almost entirely upon the surgeon's ability to remove the causative factor. Operation is indicated in all cases of varicocele complicated by inguinal hernia of the same side, in all cases complicated by hydrocele of the same side, in cases giving a history of recurrent attacks of phlebitis and thrombosis or of venous rupture, in those which show a pronounced degree of venous dilatation, and in those which produce neuralgic pain in the testis or pain radiating along the spermatic cord and down the thigh, associated or not with pain in the back and a characteristic dragging sensation; moreover, steady increase in size and progression of symptoms in spite of appropriate non-operative treatment. The latter implies avoidance of constipation, cold ablutions of the parts, sexual hygiene, and the wearing of a well-fitting suspensory. Heineck commends resection of the dilated veins, together with an appropriate area of the pendulous and denuded scrotum. The cord is exposed by the high incision, and care is taken to leave not only the vas but the spermatic artery and the small veins coursing in the sheath of the vas. Before removing the redundant scrotum a double lined cobbler's stitch is applied proximal to the transverse scrotal incision as a hemostatic; moreover, the median septum is secured by two through-and-through stitches. Skin apposition is secured by a subcuticular stitch, no hemostat being required.

ANGIOMA OF THE MAMMARY GLAND.

CARL (*Deutsche Zeitschrift für Chirurgie*, Bd. 111, H. 1-3) states that in a 22-year-old girl there was observed a mammary tumor which had been gradually increasing in size since childhood. For the past three years it was painful. No injury had been received so far as the patient knew. The tumor was located in the upper outer portion and in the depths of the left mammary gland. Upon palpation it seemed to be either a fibroadenoma or a cyst. The patient desired operation because of the pain which the condition produced. During the operation it was found that the tumor, which was about the size of a walnut, could not be shelled out. After it was removed it was found to be soft and to a slight extent fluctuating. On being cut into it was found to contain a chocolate-brown fluid. Microscopic investigation showed that the tumor was encapsulated and that the interior was composed largely of blood-vessels with some connective tissue around the larger sized vessels. These findings indicated that the tumor was a congenital hemangioma into which hemorrhage had occurred apparently because of some external influence. Although the operation was done three years ago, there has been no recurrence.

INJURIES TO THE FIRST TWO CERVICAL VERTEBRAE.

BRILL (*Deutsche Zeitschrift für Chirurgie,* Bd. 111, H. 4 to 6) reports three cases of injury to the first two cervical vertebræ, and says that treatment depends upon whether in a given case there is a bilateral rotation luxation, a unilateral rotation luxation, or a flexion luxation; also whether the odontoid process is broken or not. In a case of bilateral rotation luxation one should attempt a reposition, while in the other varieties there is constant danger that through the manipulation in efforts at reduction the fractured odontoid process will press upon and injure the cord. In these varieties of injury it is advised that all unnecessary movements of the head and neck be avoided, and that the parts be fixed in the best possible position so that there are exhibited the least possible evidences of compression.

EXOSTOSIS OF THE OS CALCIS.

BERRY (*Albany Medical Annals,* October, 1911) notes that an exostosis of the os calcis can be found in a fair percentage of patients complaining of painful feet; thus Benke found spurs sixteen times out of four hundred and twenty-three radiographs of feet taken on account of various foot troubles. In two hundred and fifty men and women who had not complained of foot trouble he found bilateral spurs in one woman and two men. Probably, however, these were of the character of spurs such as may be found in the Achilles tendon. These spurs are situated in the substance of the tendon, they cause no pain, and are probably the result of osteoarthritic changes. In a study of ninety anatomical specimens Bradford found a number of exostoses of the os calcis. Bauman and other writers state that the condition is most common in men between the ages of twenty and thirty, but it may be frequently found in women. The exostoses may be present at any age. Whites are more affected than negroes. One or both heels may be affected. Chrysospathes believed that they are due to so-called skeletal variations, found in the epiphyseal line, and are caused by a misplacement downward of the epiphysis of the os calcis, which unites at from the fourteenth to the twenty-second year.

Bauman believes that the great majority of exostoses of the os calcis are due to a pathological process which begins as a periostitis. The spurs are formed at the insertion or origin of muscles or tendons, and along their course, or at the epiphyseal line, these being the points of least resistance. What is back of the pathological process is hard to say. The Neisser organism has been found to be present in some of these cases. Baer was one of the first to call attention to the relation between gonorrhea and exostoses of the os calcis. In other cases many different cocci have been found, including the streptococcus, the staphylococcus, etc. Arthritis deformans, influenza, tuberculosis, syphilis, rheumatism, gout, ossification of tendinous tissue, and ossifying periostitis, have all been described as etiological factors in the causation of the spurs. Blenke thinks that an arteriosclerosis is the etiological factor. Paul Reclus thinks that the exostoses are but exaggerations of normal prominences. Mett attributes many cases of painful feet to a mechanical cause, due to a shortening of the gastrocnemius muscle, producing a non-deforming clubfoot. The plantar fascia gives way and periostitis, neuroma, ostitic growths, and bursitis follow as complications.

Jacquet thinks that the spurs develop in muscles subject to strain. Hurtodo attributes the formation of the spurs to hard work in a standing position, and Springer believes them to be frequently traumatic in origin, either by direct injury of the bone or by a pull on the periosteum by muscles.

The symptoms of exostosis of the os calcis are characteristically distinct. The patients complain of a pain in the heel, sometimes burning in character, sometimes described as a boring or sticking sensation. The heel is sensitive to pressure, and in

walking the patient throws his weight forward on the front part of the foot, which in time leads to strain and irritation of the whole foot, and thus may give the appearance of ordinary weakened foot trouble. There may have been a previous history of gonorrhea, influenza, or other infection. There may be a history of long-continued strain or pressure on the feet, or there may be a history of trauma.

Examination shows the heel and plantar fascia tender to pressure, with a point of greatest tenderness directly over the internal tuberosity of the os calcis.

This definite point of greatest tenderness, together with the history and other symptoms, is almost pathognomonic of the condition, but an *x*-ray picture will absolutely confirm or disapprove the diagnosis.

Rational treatment consists in the operative removal of the exostosis, although in mild cases, if there is any objection to an operation, a specially constructed brace to relieve pressure over the sensitive point may be tried.

Some operators use a linear incision directly over the exostosis, retracting the tissues and removing the growth with rongeur forceps and bone curette. Other operators make a U-shaped incision around the heel and retract the tissues on the under surface of the heel forward. This incision allows a perfect exposure of the point of operation, and the resulting scar is in no danger of being irritated when the patient begins to use the foot. The writer has found no record of recurrence of the trouble after operative treatment, although it has sometimes been necessary to further treat the weakened and strained condition of the foot, caused by faulty attitudes, which were assumed by the patient to relieve his tender heel.

Berry has operated on four patients, using the U-shaped incision and removing the growth by rongeur forceps and bone curette. In each case the exostosis was found to lie directly under the attachment of the plantar fascia to the internal tuberosity, but it was not necessary to cut the attachment of the fascia in removing the growth. The incision was closed with catgut without drainage, and the patient allowed to bear weight on the foot after two weeks. The results were excellent.

ENDONASAL OPERATION FOR TUMOR OF THE HYPOPHYSIS.

HIRSCH (*Berliner klinische Wochenschrift*, Jahrgang 48, N. 43) says that tumors of the hypophysis manifest themselves in three forms: (1) As acromegaly, first described by Pierre Marie in 1886, and characterized by increase in size of the hands, feet, nose, tongue, lips, and, as a rule, accompanied by disturbances in the sexual functions. Disturbances in sight may also be present. (2) As degeneratio adiposogenitalio, first described by Fröhlich in 1902, consisting of increase in fatty tissue, usually accompanied by disturbances in the functions of the sexual glands and trophic disturbances, such as falling of the hair, and occasionally by disturbances of sight. (3) As disturbances of sight without any striking general phenomena, resulting at times in blindness. Headache of varying intensity may accompany all three forms, but may be entirely absent. It is interesting and important to observe that acromegaly is produced only by tumors of the anterior portion of the hypophysis, and, in fact, as Benda has shown, only by adenoma or adenocarcinoma. The degeneratio adiposogenitalio may be produced by tumor in any portion of the hypophysis, and, according to Erdheim, is not caused by the tumor itself but by pressure upon a certain center.

The diagnosis of a tumor of the hypophysis is based upon one or other of the clinical pictures described. An important aid in the diagnosis are the *x*-rays, as they show any changes in the conformation in the sella turcica, but the *x*-ray examination is not absolutely diagnostic, as this change in the sella may be brought about by other causes, as hydrocephalus, chronic circumscribed meningitis, or tumors of other portions of the brain. Headache, somnolence, and low temperature frequently occur in

tumor of the hypophysis. The only treatment is surgical. Thyroidin, iodine, and hypophysin have only a temporary influence. The operative methods are divided into the intracranial and the extracranial. The first to carry out the hypophysis operation was Horsley, who adopted the intracranial method by way of the middle cerebral fossa. A second intracranial method, as first used by Krause, is by way of the anterior cerebral fossa.

Schloffer was the first in 1907 to make use of the nasal operation. This method has also been used by von Eiselberg, Hochenegg, and others. By this method there have been operated upon by various surgeons 53 cases with 21 deaths. Immediately after the first operation by the nasal route the author came to the conclusion that the method of cutting into the nasal bones did not serve any definite purpose in exposing the anterior surface of the sphenoid bone, that the complete removal of the tumor by this method was not accomplished, and that the partial removal of the tumor sufficed to favorably influence the symptoms of the disease. These considerations, together with the fact that surgeons have great difficulty in manipulations in the depth of the wound, led the author to adopt the endonasal route for operation upon hypophyseal tumors. An additional advantage of this method is that a portion of the operation can be carried out under local anesthesia. The sphenoidal sinus was opened after first removing the middle turbinate and a portion of the ethmoid was curetted away, which in turn exposed the sella turcica. This was then chiseled away and the dura exposed. On cutting through the dura the hypophyseal tumor became visible. This tumor is usually soft and can be removed through a relatively small opening. The author has operated on 12 cases, 10 of which recovered and two died. All forms of the disease were represented. The deaths in the fatal cases could not have been avoided by any other method of operation. The endonasal method is adapted to all cases in which the tumor protrudes toward the sphenoid sinus. Good results are to be expected if the tumor occupies in greater part the sella turcica or is of a cystic character. When the tumor takes an intracranial direction in its development but very little can be expected of this, as is the case with all other extracranial methods.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

Humanity has lost one of its greatest benefactors by the death of Lord Lister at the ripe age of eighty-four. His health had been failing for some time, and the final collapse was due to extreme old age. At the funeral service held in Westminster Abbey every country in Europe and every branch of science paid tribute to the memory of the man whose life-work constituted the greatest advance surgery has ever made. He first graduated as B.A. in the University of London, but it was in Scotland that most of his epoch-making work was carried out. He first went to Glasgow as Regius Professor of Surgery, and later on held a similar position in Edinburgh. He gave his great discovery to the world in 1870, a year after he went to Edinburgh. The latter part of his career was passed in London, where he held a surgical professorship at King's College Hospital. His decision to leave Edinburgh was not well received in the Scottish capital, and the first time he entered the operating theater after his plans were made known he was hissed by the students. It would be difficult to recount the many honors which were so deservedly bestowed upon the "Author of Modern Surgery;" he was the first member of his profession to be raised to the peerage, and he was one of the first twelve members of the Order of Merit. Not only

his own countrymen but the people of all nations have shown their gratitude to the man who robbed surgery of its chief terror and lessened the sum of human suffering.

The University of London has never yet possessed a permanent home. It has lodged in the buildings of the Imperial Institute for the past dozen years, but this has never been regarded as a lasting arrangement. The whole matter has been thoroughly dealt with in the fourth Report of the Royal Commission on University Education in London. The Commissioners state that the inception of any scheme for the reorganization of the University would be seriously delayed after parliamentary sanction had been gained unless steps had previously been taken to provide for the University as reconstituted a site and buildings more convenient and adequate than those occupied at present. The Commissioners consider that it is a matter of national importance that the University of London should be recognized and accepted as a great public institution, and that it is both fitting and right that such an institution should have for its headquarters permanent buildings appropriate to its dignity and importance and situated conveniently for the work it has to do. As to finance, it is pointed out that great universities are not self-supporting, as the fees of students are quite inadequate to provide for instruction in a wide range of subjects on an advanced plane and at the same time provide facilities for systematic research. The University of London already receives contributions from local and Imperial funds, and the government has always been responsible for its housing. But for further development the University will have to depend largely on the endowments of private benefactors, and if such can be obtained the Commissioners foresee almost unlimited possibilities for the University of London in the future.

A serious attempt to reform the criminal classes has been inaugurated by the opening of a new prison or "House of Detention." Ordinary convicts will not be sent to this prison; it will be reserved for those persons whom it is considered desirable to keep permanently under lock and key, and every inmate must have been convicted at least four times. In short, the habitual criminal is to be reformed by kindness. The professional criminal will first serve his time of penal servitude for the specific offense for which he was convicted, and then will pass into the House of Detention for periods varying from five to ten years. Here the whole idea will be to induce the men to behave themselves. Their cells will be comfortable, they will be allowed to converse with each other, and they will receive payment for the work that they do. The best behaved may even be permitted an occasional pipe, and they will be allowed to have plenty of books. Prisoners may be released when they seem to have really turned over a new leaf. Whether this system of treatment will be successful in inducing the veteran in crime to become a law-abiding citizen remains to be proved; possibly it may be so successful that the inmates of this latest "hotel" may be reluctant to leave their "sheltered life" to face again the battle of life.

Reports have reached this country that the scientists of the Rockefeller Institute have discovered a serum for the cure of pneumonia. Considering what an enormous number of deaths pneumonia is responsible for in this country, such a discovery, if it stands the test of time, ought to make an appreciable difference to the death-rate, especially during the winter months. We shall await with interest further reports as to the efficacy of the new serum.

No drinking during business hours was the key-note of a conference lately held at the Mansion House in which many well-known doctors took part. The habit of "treating" customers which leads to drinking during the hours of business was held to be a matter of great concern, especially in its effect upon the many thousands of young men engaged in city life. It was urged that the rule should be "total abstinence during business."

The important crisis in the affairs of medical practitioners in relation to the Na-

tional Insurance Bill has now been reached. For the past three days delegates sent up by the various divisions of the British Medical Association all over the country have been sitting in conference in order to decide finally what the attitude of the profession in general toward the Act shall be. The first thing to decide was whether the Association should continue to negotiate with the Insurance Commissioners, or whether there should be an abrupt refusal to have anything to do with the Act in its present form. There was a very keen discussion on this point, and it was finally decided that negotiations should not be broken off, but that members should be nominated to serve on the National Advisory Committee, and a sickness insurance committee was also appointed to deal with all matters affecting the profession in relation to national insurance. Other resolutions reiterated the determination of the members to insist upon their "minimum" demands as embodied in their famous "six-point programme," which included the fixing of an income limit for the insured, adequate capitation fees, and freedom from friendly society control. The Council of the Association was directed to inform the Insurance Commissioners, in plain and unmistakable language, that unless the minimum demands of the profession were embodied in the regulations in such a manner as to be effectual and permanent, it was the intention of the British Medical Association to call upon its members and all other medical practitioners to decline to undertake any medical duties which might be assigned to them under the Act. A seventh point was added to the original programme—that the power of considering all complaints against medical men be vested in the local medical committee, with the right of appeal to a central medical board to be appointed for that purpose. This point will insure that the discipline of medical officers under the Act will be placed unreservedly in the hands of the profession, and thus preserve the sacred right of all professions—to be judged exclusively by members of their own body. The reasonable attitude which has been finally taken up by the conference will be certain to command the respect and sympathy of the general public.

PARIS LETTER.

BY M. A. C. TUCKER, M.D.

One of the most illustrious French surgeons, Professor Lannelongue, has just passed away, carrying to his grave the unanimous regrets of his countrymen. A fervent adept of Pasteur theories, he was one of the first to understand the immense importance of laboratory researches for medical and surgical purposes, foreseeing the predominating rôle that bacteriology, with its corollaries such as antisepsis and asepsis, would play on the surgical stage. Early in his career Dr. Lannelongue concentrated his studies upon infantile surgery without losing sight of surgical evolution in general. The lamented professor particularly distinguished himself by his study of osteomyelitis and by his large contributions to the treatment of surgical tuberculosis—coxalgia, more especially. Many amongst the most eminent French surgical notables of the day have been trained at his school and have likewise contributed to generalize the ideas which have created the unprecedented development and progress of contemporary surgical science, art, and practice.

When a medical attendant has prescribed a treatment with results not in accordance with expectations the medical case often degenerates into a judicial one, as patients are wont to prove before tribunal and courts that it is absolutely and entirely the fault of the man of the art; and it is upon this basis that a victim of burns by Roentgen or *x*-rays sued a doctor for damages, but the case was dismissed by the judge, who rendered the following decision:

"Considering *a priori* it must be admitted as a principle that it is most inadvisable for a court of justice to expose itself to the charge of stopping particularly, in urgent and difficult cases, the so often beneficial initiative of the doctor, for such interven-

tion would certainly tend to create a serious obstacle to the development of medical science on its way of continual progress, the judges could not be justified in accepting proceedings against doctors for facts arising out of the normal and legitimate exercise of their profession, unless these facts arise, in some measure, from a fault 'extra-professional' or from a fault punishable in common law and imputable to any man, independently of the treatment prescribed and directed; moreover, charges of this nature should not be maintained unless they constitute in themselves a grave fault of diagnosis, of treatment, or of operation inconsistent with the actual state of medical science, or unless such facts are the consequence of ignorance or neglect that could not be excusable in a person invested with the title of doctor, with the knowledge, the conscience, and the good sense required for the proper exercise of his skill."

Here is another action in which the ungratefulness of a certain class of patients is vividly illustrated. The case sounds much more like an attempt at blackmail than anything else. A military doctor received one day in his hospital ward a young trooper who manifested serious signs of pulmonary tuberculosis. The patient was naturally treated with all desirable care. At the next meeting of the local military medical commission it was unanimously decided that the young fellow be sent home with a full certificate of freedom. The latter accordingly was liberated the next morning, but returned after two days in the company of his father, a rich manufacturer of the district, who declared himself greatly moved by the great kindness, the anxious, enlightened and diligent attention and care bestowed upon his boy, for all of which he was very thankful; and he—the father—asked what, in the opinion of the major, would be the proper course to follow in order to obtain a radical and complete cure. The doctor gave the traditional triad—open-air cure, rest, overfeeding, etc. The pater decided immediately to send his heir to his country seat with a full array of servants and attendants, and when departing he thanked again our confrère, and taking his hands with great effusion said: "Doctor, you will soon learn that you have not dealt with an ungrateful man."

Just one year later our medical officer, who had done all that could have been expected of him, and even more—for nothing compelled him to give so freely his advice for the benefit of a liberated soldier, a civilian—received from the French War Office the following message: "Dear Sir: I have the honor to inform you that Mr. X., whose son had been medically treated by you and who was subsequently advised by yourself about the course to be adopted for the recuperation of his health, has sent in a statement of claim, stating that his son is now completely cured and that the recovery is a clear proof of your error of judgment and of diagnosis, and he consequently sues you for 5000 francs damages as a compensation for the unnecessary expenses incurred by plaintiff and occasioned by your unfounded opinions."

You may well realize the stupefaction of our medical brother. It is hardly necessary to state that he had not the slightest trouble to prove, by documents, that his science had never been at fault for one instant, and that "the grateful father" was laughed out of court with full costs. Supposing that he had not been *grateful*, goodness knows what would have happened!